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WU, KAI

<120> POLYKETIDE SYNTHASE ENZYMES AND RECOMBINANT DNA
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<130> 30062-20026.00

<140> 09/410,551

<141> 1999-10-01

<160> 71

<170> PatentIn Ver. 2.0

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<212> DNA

<213> *Streptomyces hygroscopicus*

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Phe	His	Leu	Pro	Glu	Val	Arg	Cys	Tyr	Pro	Ala	Glu	Gln	Ala	Ala	Thr
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Glu	Glu	Leu	Thr	Leu	Arg	Thr	Ser	Gln	Met	Asn	Ala	Thr	Gly	Val	His
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<220>
 <223> Description of Artificial Sequence: Linker

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<210> 4
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<220>
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<400> 4
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<400> 5
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<213> Artificial Sequence
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PKS synthase fragment

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102200-002701

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Trp Val Asp Glu Pro Ala Asp Asp Gly Arg Arg Arg Phe Thr Val His	
995 1000 1005	
acc cgc acc ggc gac gcc ccg tgg acg ctg cac gcc gag ggg gtg ctg	3071
Thr Arg Thr Gly Asp Ala Pro Trp Thr Leu His Ala Glu Gly Val Leu	
1010 1015 1020	
cgc ccc cat ggc acg gcc ctg ccc gat gcg gcc gac gcc gag tgg ccc	3119
Arg Pro His Gly Thr Ala Leu Pro Asp Ala Ala Asp Ala Glu Trp Pro	
1025 1030 1035	
cca ccg ggc gcg gtg ccc gcg gac ggg ctg ccg ggt gtg tgg cgc cgg	3167
Pro Pro Gly Ala Val Pro Ala Asp Gly Leu Pro Gly Val Trp Arg Arg	
1040 1045 1050 1055	
ggg gac cag gtc ttc gcc gag gcc gag gtg gac gga ccg gac ggt ttc	3215
Gly Asp Gln Val Phe Ala Glu Ala Glu Val Asp Gly Pro Asp Gly Phe	
1060 1065 1070	
gtg gtg cac ccc gac ctg ctc gac gcg gtc ttc tcc gcg gtc gcc gac	3263
Val Val His Pro Asp Leu Leu Asp Ala Val Phe Ser Ala Val Gly Asp	
1075 1080 1085	
gga agc cgc cag ccg gcc gga tgg cgc gac ctg acg gtg cac gcg tcg	3311
Gly Ser Arg Gln Pro Ala Gly Trp Arg Asp Leu Thr Val His Ala Ser	
1090 1095 1100	
gac gcc acc gta ctg cgc gcc tgc ctc acc cgg cgc acc gac gga gcc	3359
Asp Ala Thr Val Leu Arg Ala Cys Leu Thr Arg Arg Thr Asp Gly Ala	
1105 1110 1115	

004024.052704

gag	ttc	gcc	gct	ttc	gac	ggc	gcc	ggc	ctg	cgc	gta	ctc	acc	cgc	3407
Met	Gly	Phe	Ala	Ala	Phe	Asp	Gly	Ala	Gly	Leu	Pro	Val	Leu	Thr	Ala
1120				1125					1130					1135	
gag	gcg	gtg	acg	ctg	cgg	gag	gtg	gcg	tca	cgc	tcc	ggc	tcc	gag	gag
Glu	Ala	Val	Thr	Leu	Arg	Glu	Val	Ala	Ser	Pro	Ser	Gly	Ser	Glu	Glu
			1140						1145					1150	3455
tcg	gac	ggc	ctg	cac	cgg	ttg	gag	tgg	ctc	cgc	gtc	gcc	gag	cgc	gtc
Ser	Asp	Gly	Leu	His	Arg	Leu	Glu	Trp	Leu	Ala	Val	Ala	Glu	Ala	Val
			1155					1160					1165		3503
tac	gac	ggg	gac	ctg	ccc	gag	gga	cat	gtc	ctg	atc	acc	gcc	gcc	cac
Tyr	Asp	Gly	Asp	Leu	Pro	Glu	Gly	His	Val	Leu	Ile	Thr	Ala	Ala	His
			1170				1175					1180			3551
ccc	gac	gac	ccc	gag	gac	ata	ccc	acc	cgc	gcc	cac	acc	cgc	gcc	acc
Pro	Asp	Asp	Pro	Glu	Asp	Ile	Pro	Thr	Arg	Ala	His	Thr	Arg	Ala	Thr
			1185			1190					1195				3599
cgc	gtc	ctg	acc	gcc	ctg	caa	cac	cac	ctc	acc	acc	acc	gac	cac	acc
Arg	Val	Leu	Thr	Ala	Leu	Gln	His	His	Leu	Thr	Thr	Thr	Asp	His	Thr
1200				1205					1210					1215	3647
ctc	atc	gtc	cac	acc	acc	acc	gac	ccc	gcc	ggc	gcc	acc	gtc	acc	ggc
Leu	Ile	Val	His	Thr	Thr	Thr	Asp	Pro	Ala	Gly	Ala	Thr	Val	Thr	Gly
				1220					1225					1230	3695
ctc	acc	cgc	acc	gcc	cag	aac	gaa	cac	ccc	cac	cgc	atc	cgc	ctc	atc
Leu	Thr	Arg	Thr	Ala	Gln	Asn	Glu	His	Pro	His	Arg	Ile	Arg	Leu	Ile
			1235				1240						1245		3743
gaa	acc	gac	cac	ccc	cac	ccc	ctc	ccc	ctg	gcc	cga	ctc	gcc	acc	
Glu	Thr	Asp	His	Pro	His	Thr	Pro	Leu	Pro	Leu	Ala	Gln	Leu	Ala	Thr
			1250				1255				1260				3791
ctc	gac	cac	ccc	cac	ctc	cgc	ctc	acc	cac	cac	acc	ctc	cac	cac	ccc
Leu	Asp	His	Pro	His	Leu	Arg	Leu	Thr	His	His	Thr	Leu	His	His	Pro
			1265			1270					1275				3839
cac	ctc	acc	ccc	ctc	cac	acc	acc	acc	cca	ccc	acc	acc	acc	ccc	ctc
His	Leu	Thr	Pro	Leu	His	Thr	Thr	Thr	Pro	Pro	Thr	Thr	Thr	Pro	Leu
1280				1285					1290					1295	3887
aac	ccc	gaa	cac	gcc	atc	atc	atc	acc	ggc	ggc	tcc	ggc	acc	ctc	gcc
Asn	Pro	Glu	His	Ala	Ile	Ile	Ile	Thr	Gly	Gly	Ser	Gly	Thr	Leu	Ala
				1300					1305					1310	3935
ggc	atc	ctc	gcc	cgc	cac	ctg	aac	cac	ccc	cac	acc	tac	ctc	ctc	tcc
Gly	Ile	Leu	Ala	Arg	His	Leu	Asn	His	Pro	His	Thr	Tyr	Leu	Leu	Ser
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cgc	acc	cca	ccc	ccc	gac	gcc	acc	ccc	ggc	acc	cac	ctc	ccc	tgc	gac

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<210> 17
<211> 1488
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic PKS
      synthase fragment

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Ala Ala Val Leu Leu Gly His Val Gly Gly Glu Asp Ile Pro Ala Thr Ala
      20             25             30

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Ala	Phe	Lys	Asp	Leu	Gly	Ile	Asp	Ser	Leu	Thr	Ala	Val	Gln	Leu	Arg
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Asn	Ala	Leu	Thr	Glu	Ala	Thr	Gly	Val	Arg	Leu	Asn	Ala	Thr	Ala	Val
50						55				60					
Phe	Asp	Phe	Pro	Thr	Pro	His	Val	Leu	Ala	Gly	Lys	Leu	Gly	Asp	Glu
65				70						75				80	
Leu	Thr	Gly	Thr	Arg	Ala	Pro	Val	Val	Pro	Arg	Thr	Ala	Ala	Thr	Ala
				85				90						95	
Gly	Ala	His	Asp	Glu	Pro	Leu	Ala	Ile	Val	Gly	Met	Ala	Cys	Arg	Leu
		100						105				110			
Pro	Gly	Gly	Val	Ala	Ser	Pro	Glu	Glu	Leu	Trp	His	Leu	Val	Ala	Ser
		115				120						125			
Gly	Thr	Asp	Ala	Ile	Thr	Glu	Phe	Pro	Thr	Asp	Arg	Gly	Trp	Asp	Val
130						135				140					
Asp	Ala	Ile	Tyr	Asp	Pro	Asp	Pro	Asp	Ala	Ile	Gly	Lys	Thr	Phe	Val
145				150						155				160	
Arg	His	Gly	Gly	Phe	Leu	Thr	Gly	Ala	Thr	Gly	Phe	Asp	Ala	Ala	Phe
		165						170						175	
Phe	Gly	Ile	Ser	Pro	Arg	Glu	Ala	Leu	Ala	Met	Asp	Pro	Gln	Gln	Arg
		180						185				190			
Val	Leu	Leu	Glu	Thr	Ser	Trp	Glu	Ala	Phe	Glu	Ser	Ala	Gly	Ile	Thr
195						200						205			
Pro	Asp	Ser	Thr	Arg	Gly	Ser	Asp	Thr	Gly	Val	Phe	Val	Gly	Ala	Phe
210						215				220					
Ser	Tyr	Gly	Tyr	Gly	Thr	Gly	Ala	Asp	Thr	Asp	Gly	Phe	Gly	Ala	Thr
225				230						235				240	
Gly	Ser	Gln	Thr	Ser	Val	Leu	Ser	Gly	Arg	Leu	Ser	Tyr	Phe	Tyr	Gly
				245				250						255	
Leu	Glu	Gly	Pro	Ala	Val	Thr	Val	Asp	Thr	Ala	Cys	Ser	Ser	Ser	Leu
		260						265				270			
Val	Ala	Leu	His	Gln	Ala	Gly	Gln	Ser	Leu	Arg	Ser	Gly	Glu	Cys	Ser
275						280						285			
Leu	Ala	Leu	Val	Gly	Gly	Val	Thr	Val	Met	Ala	Ser	Pro	Gly	Gly	Phe
290						295				300					
Val	Glu	Phe	Ser	Arg	Gln	Arg	Gly	Leu	Ala	Pro	Asp	Gly	Arg	Ala	Lys
305				310						315				320	
Ala	Phe	Gly	Ala	Gly	Ala	Asp	Gly	Thr	Ser	Phe	Ala	Glu	Gly	Ala	Gly
		325						330				335			

Val Leu Ile Val Glu Arg Leu Ser Asp Ala Glu Arg Asn Gly His Thr
 340 345 350
 Val Leu Ala Val Val Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser
 355 360 365
 Asn Gly Leu Ser Ala Pro Asn Gly Pro Ser Gln Glu Arg Val Ile Arg
 370 375 380
 Gln Ala Leu Ala Asn Ala Gly Leu Thr Pro Ala Asp Val Asp Ala Val
 385 390 395 400
 Glu Ala His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln
 405 410 415
 Ala Val Leu Ala Thr Tyr Gly Gln Glu Arg Ala Thr Pro Leu Leu Leu
 420 425 430
 Gly Ser Leu Lys Ser Asn Ile Gly His Ala Gln Ala Ala Ser Gly Val
 435 440 445
 Ala Gly Ile Ile Lys Met Val Gln Ala Leu Arg His Gly Glu Leu Pro
 450 455 460
 Pro Thr Leu His Ala Asp Glu Pro Ser Pro His Val Asp Trp Thr Ala
 465 470 475 480
 Gly Ala Val Glu Leu Leu Thr Ser Ala Arg Pro Trp Pro Glu Thr Asp
 485 490 495
 Arg Pro Arg Arg Ala Gly Val Ser Ser Phe Gly Ile Ser Gly Thr Asn
 500 505 510
 Ala His Val Ile Leu Glu Ser Ala Pro Pro Thr Gln Pro Ala Asp Asn
 515 520 525
 Ala Val Ile Glu Arg Ala Pro Glu Trp Val Pro Leu Val Ile Ser Ala
 530 535 540
 Arg Thr Gln Ser Ala Leu Thr Glu His Glu Gly Arg Leu Arg Ala Tyr
 545 550 555 560
 Leu Ala Ala Ser Pro Gly Val Asp Met Arg Ala Val Ala Ser Thr Leu
 565 570 575
 Ala Met Thr Arg Ser Val Phe Glu His Arg Ala Val Leu Leu Gly Asp
 580 585 590
 Asp Thr Val Thr Gly Thr Ala Val Ser Asp Pro Arg Ala Val Phe Val
 595 600 605
 Phe Pro Gly Gln Gly Ser Gln Arg Ala Gly Met Gly Glu Glu Leu Ala
 610 615 620
 Ala Ala Phe Pro Val Phe Ala Arg Ile His Gln Gln Val Trp Asp Leu
 625 630 635 640

Leu Asp Val Pro Asp Leu Glu Val Asn Glu Thr Gly Tyr Ala Gln Pro
 645 650 655
 Ala Leu Phe Ala Met Gln Val Ala Leu Phe Gly Leu Leu Glu Ser Trp
 660 665 670
 Gly Val Arg Pro Asp Ala Val Ile Gly His Ser Val Gly Glu Leu Ala
 675 680 685
 Ala Ala Tyr Val Ser Gly Val Trp Ser Leu Glu Asp Ala Cys Thr Leu
 690 695 700
 Val Ser Ala Arg Ala Arg Leu Met Gln Ala Leu Pro Ala Gly Gly Val
 705 710 715 720
 Met Val Ala Val Pro Val Ser Glu Asp Glu Ala Arg Ala Val Leu Gly
 725 730 735
 Glu Gly Val Glu Ile Ala Ala Val Asn Gly Pro Ser Ser Val Val Leu
 740 745 750
 Ser Gly Asp Glu Ala Ala Val Leu Gln Ala Ala Glu Gly Leu Gly Lys
 755 760 765
 Trp Thr Arg Leu Ala Thr Ser His Ala Phe His Ser Ala Arg Met Glu
 770 775 780
 Pro Met Leu Glu Glu Phe Arg Ala Val Ala Glu Gly Leu Thr Tyr Arg
 785 790 795 800
 Thr Pro Gln Val Ser Met Ala Val Gly Asp Gln Val Thr Thr Ala Glu
 805 810 815
 Tyr Trp Val Arg Gln Val Arg Asp Thr Val Arg Phe Gly Glu Gln Val
 820 825 830
 Ala Ser Tyr Glu Asp Ala Val Phe Val Glu Leu Gly Ala Asp Arg Ser
 835 840 845
 Leu Ala Arg Leu Val Asp Gly Val Ala Met Leu His Gly Asp His Glu
 850 855 860
 Ile Gln Ala Ala Ile Gly Ala Leu Ala His Leu Tyr Val Asn Gly Val
 865 870 875 880
 Thr Val Asp Trp Pro Ala Leu Leu Gly Asp Ala Pro Ala Thr Arg Val
 885 890 895
 Leu Asp Leu Pro Thr Tyr Ala Phe Gln His Gln Arg Tyr Trp Leu Glu
 900 905 910
 Ser Ala Arg Pro Ala Ala Ser Asp Ala Gly His Pro Val Leu Gly Ser
 915 920 925
 Gly Ile Ala Leu Ala Gly Ser Pro Gly Arg Val Phe Thr Gly Ser Val
 930 935 940

Pro Thr Gly Ala Asp Arg Ala Val Phe Val Ala Glu Leu Ala Leu Ala
 945 950 955 960
 Ala Ala Asp Ala Val Asp Cys Ala Thr Val Glu Arg Leu Asp Ile Ala
 965 970 975
 Ser Val Pro Gly Arg Pro Gly His Gly Arg Thr Thr Val Gln Thr Trp
 980 985 990
 Val Asp Glu Pro Ala Asp Asp Gly Arg Arg Arg Phe Thr Val His Thr
 995 1000 1005
 Arg Thr Gly Asp Ala Pro Trp Thr Leu His Ala Glu Gly Val Leu Arg
 1010 1015 1020
 Pro His Gly Thr Ala Leu Pro Asp Ala Ala Asp Ala Glu Trp Pro Pro
 025 1030 1035 104
 Pro Gly Ala Val Pro Ala Asp Gly Leu Pro Gly Val Trp Arg Arg Gly
 1045 1050 1055
 Asp Gln Val Phe Ala Glu Ala Glu Val Asp Gly Pro Asp Gly Phe Val
 1060 1065 1070
 Val His Pro Asp Leu Leu Asp Ala Val Phe Ser Ala Val Gly Asp Gly
 1075 1080 1085
 Ser Arg Gln Pro Ala Gly Trp Arg Asp Leu Thr Val His Ala Ser Asp
 1090 1095 1100
 Ala Thr Val Leu Arg Ala Cys Leu Thr Arg Arg Thr Asp Gly Ala Met
 105 1110 1115 112
 Gly Phe Ala Ala Phe Asp Gly Ala Gly Leu Pro Val Leu Thr Ala Glu
 1125 1130 1135
 Ala Val Thr Leu Arg Glu Val Ala Ser Pro Ser Gly Ser Glu Glu Ser
 1140 1145 1150
 Asp Gly Leu His Arg Leu Glu Trp Leu Ala Val Ala Glu Ala Val Tyr
 1155 1160 1165
 Asp Gly Asp Leu Pro Glu Gly His Val Leu Ile Thr Ala Ala His Pro
 1170 1175 1180
 Asp Asp Pro Glu Asp Ile Pro Thr Arg Ala His Thr Arg Ala Thr Arg
 185 1190 1195 120
 Val Leu Thr Ala Leu Gln His His Leu Thr Thr Thr Asp His Thr Leu
 1205 1210 1215
 Ile Val His Thr Thr Thr Asp Pro Ala Gly Ala Thr Val Thr Gly Leu
 1220 1225 1230
 Thr Arg Thr Ala Gln Asn Glu His Pro His Arg Ile Arg Leu Ile Glu
 1235 1240 1245

Thr Asp His Pro His Thr Pro Leu Pro Leu Ala Gln Leu Ala Thr Leu
1250 1255 1260

Asp His Pro His Leu Arg Leu Thr His His Thr Leu His His Pro His
265 1270 1275 128

Leu Thr Pro Leu His Thr Thr Thr Pro Pro Thr Thr Thr Pro Leu Asn
1285 1290 1295

Pro Glu His Ala Ile Ile Ile Thr Gly Gly Ser Gly Thr Leu Ala Gly
1300 1305 1310

Ile Leu Ala Arg His Leu Asn His Pro His Thr Tyr Leu Leu Ser Arg
1315 1320 1325

Thr Pro Pro Pro Asp Ala Thr Pro Gly Thr His Leu Pro Cys Asp Val
1330 1335 1340

Gly Asp Pro His Gln Leu Ala Thr Thr Leu Thr His Ile Pro Gln Pro
345 1350 1355 136

Leu Thr Ala Ile Phe His Thr Ala Ala Thr Leu Asp Asp Gly Ile Leu
1365 1370 1375

His Ala Leu Thr Pro Asp Arg Leu Thr Thr Val Leu His Pro Lys Ala
1380 1385 1390

Asn Ala Ala Trp His Leu His His Leu Thr Gln Asn Gln Pro Leu Thr
1395 1400 1405

His Phe Val Leu Tyr Ser Ser Ala Ala Val Leu Gly Ser Pro Gly
1410 1415 1420

Gln Gly Asn Tyr Ala Ala Ala Asn Ala Phe Leu Asp Ala Leu Ala Thr
425 1430 1435 144

His Arg His Thr Leu Gly Gln Pro Ala Thr Ser Ile Ala Trp Gly Met
1445 1450 1455

Trp His Thr Thr Ser Thr Leu Thr Gly Gln Leu Asp Asp Ala Asp Arg
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Asp Arg Ile Arg Arg Gly Gly Phe Leu Pro Ile Thr Asp Asp Glu Gly
1475 1480 1485

<210> 18

<211> 4571

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: DNA encoding synthetic
PKS synthase fragment

<220>

<221> CDS

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gcc	gcc	gtg	ctc	ggc	cac	gtg	ggt	ggc	gag	gac	atc	ccc	gcg	acg	gcg	98	
15	Ala	Ala	Val	Leu	Gly	His	Val	Gly	Gly	Glu	Asp	Ile	Pro	Ala	Thr	30	
20																	
gcg	ttc	aag	gac	ctc	ggc	atc	gac	tcg	ctc	acc	gcg	gtc	cag	ctg	cgc	146	
Ala	Phe	Lys	Asp	Leu	Gly	Ile	Asp	Ser	Leu	Thr	Ala	Val	Gln	Leu	Arg		
35									40					45			
aac	gcc	ctc	acc	gag	gcg	acc	ggt	gtg	cgg	ctg	aac	gcc	acg	gcg	gtc	194	
Asn	Ala	Leu	Thr	Glu	Ala	Thr	Gly	Val	Arg	Leu	Asn	Ala	Thr	Ala	Val		
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ttc	gac	ttc	ccg	acc	ccg	cac	gtg	ctc	gcc	ggg	aag	ctc	ggc	gac	gaa	242	
Phe	Asp	Phe	Pro	Thr	Pro	His	Val	Leu	Ala	Gly	Lys	Leu	Gly	Asp	Glu		
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ctg	acc	ggc	acc	cgc	gcg	ccc	gtc	gtg	ccc	cgg	acc	gcg	gcc	acg	gcc	290	
Leu	Thr	Gly	Thr	Arg	Ala	Pro	Val	Val	Pro	Arg	Thr	Ala	Ala	Thr	Ala		
80						85					90						
ggt	gcg	cac	gac	gag	ccg	ctg	gcg	atc	gtg	gga	atg	gcc	tgc	cgg	ctg	338	
Gly	Ala	His	Asp	Glu	Pro	Leu	Ala	Ile	Val	Gly	Met	Ala	Cys	Arg	Leu		
95					100					105				110			
ccc	ggc	ggg	gtc	gcg	tca	ccc	gag	gac	ctg	tgg	cac	ctc	gtg	gca	ttc	386	
Pro	Gly	Gly	Val	Ala	Ser	Pro	Glu	Glu	Leu	Trp	His	Leu	Val	Ala	Ser		
115				120									125				
ggc	acc	gac	gcc	atc	acg	gag	ttc	ccg	acg	gac	cgc	ggc	tgg	gac	gtc	434	
Gly	Thr	Asp	Ala	Ile	Thr	Glu	Phe	Pro	Thr	Asp	Arg	Gly	Trp	Asp	Val		
130								135					140				
gac	gcg	atc	tac	gac	ccg	gac	ccc	gac	gcg	atc	ggc	aag	acc	ttc	gtc	482	
Asp	Ala	Ile	Tyr	Asp	Pro	Asp	Pro	Asp	Ala	Ile	Gly	Lys	Thr	Phe	Val		
145						150						155					
cgg	cac	ggt	ggc	ttc	ctc	acc	ggc	gcg	aca	ggc	ttc	gac	gcg	gcg	ttc	530	
Arg	His	Gly	Gly	Phe	Leu	Thr	Gly	Ala	Thr	Gly	Phe	Asp	Ala	Ala	Phe		
160					165					170							
ttc	ggc	atc	agc	ccg	cgc	gag	gcc	ctc	gcg	atg	gac	ccg	cag	cag	cgg	578	
Phe	Gly	Ile	Ser	Pro	Arg	Glu	Ala	Leu	Ala	Met	Asp	Pro	Gln	Gln	Arg		
175					180					185					190		
gtg	ctc	ctg	gag	acg	tcg	tgg	gag	gcg	ttc	gaa	agc	gcc	ggc	atc	acc	626	
Val	Leu	Leu	Glu	Thr	Ser	Trp	Glu	Ala	Phe	Glu	Ser	Ala	Gly	Ile	Thr		
195				200									205				
ccg	gac	tcg	acc	cgc	ggc	agc	gac										

ggt	tac	ggt	tac	gg	acc	ggt	gcg	gac	acc	gac	ggc	ttc	ggc	gcg	acc	722
Ser	Tyr		Tyr	Gly	Thr	Gly	Ala	Asp	Thr	Asp	Gly	Phe	Gly	Ala	Thr	
		225					230					235				
ggc	tcg	cag	acc	agt	gtg	ctc	tcc	ggc	cgg	ctg	tcg	tac	ttc	tac	ggt	770
Gly	Ser	Gln	Thr	Ser	Val	Leu	Ser	Gly	Arg	Leu	Ser	Tyr	Phe	Tyr	Gly	
		240				245					250					
ctg	gag	ggt	ccg	gcg	gtc	acg	gtc	gac	acg	gcg	tgt	tcg	tcg	tcg	ctg	818
Leu	Glu	Gly	Pro	Ala	Val	Thr	Val	Asp	Thr	Ala	Cys	Ser	Ser	Ser	Leu	
255					260					265					270	
gtg	gcg	ctg	cac	gln	gcc	ggg	cag	tcg	ctg	cgc	tcc	ggc	gaa	tcg	tcg	866
Val	Ala	Leu	His	Ala	Ala	Gly	Gln	Ser	Leu	Arg	Ser	Gly	Glu	Cys	Ser	
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ctc	gcc	ctg	gtc	ggc	ggc	gtc	acg	gtg	atg	gcg	tct	ccc	ggc	ggc	ttc	914
Leu	Ala	Leu	Val	Gly	Gly	Val	Thr	Val	Met	Ala	Ser	Pro	gag	Gly	Phe	
			290					295					300			
gtg	gag	ttc	tcc	cgg	cag	cgc	ggc	ctc	gcg	ccg	gac	ggc	cgg	gcg	aag	962
Val	Glu	Phe	Ser	Arg	Gln	Arg	Gly	Leu	Ala	Pro	Asp	Gly	Arg	Ala	Lys	
		305					310					315				
gcg	ttc	ggc	gcg	ggt	gcg	gac	acg	acg	agc	ttc	gcc	gag	ggt	gcc	ggt	1010
Ala	Phe	Gly	Ala	Gly	Ala	Asp	Gly	Thr	Ser	Phe	Ala	Glu	Gly	Ala	Gly	
		320				325					330					
gtg	ctg	atc	gtc	gag	agg	ctc	tcc	gac	gcc	gaa	cgc	aac	ggt	cac	acc	1058
Val	Leu	Ile	Val	Glu	Arg	Leu	Ser	Asp	Ala	Glu	Arg	Asn	Gly	His	Thr	
					340					345					350	
gtc	ctg	gcg	gtc	gtc	cgt	ggt	tcg	gcg	gtc	aac	cag	gat	ggt	gcc	tcc	1106
Val	Leu	Ala	Val	Val	Arg	Gly	Ser	Ala	Val	Asn	Gln	Asp	Gly	Ala	Ser	
				355					360					365		
aac	ggg	ctg	tcg	gcg	ccg	aac	ggg	ccg	tcg	cag	gag	cgg	gtg	atc	cgg	1154
Asn	Gly	Leu	Ser	Ala	Pro	Asn	Gly	Pro	Ser	Gln	Glu	Arg	Val	Ile	Arg	
			370					375					380			
cag	gcc	ctg	gcc	aac	gcc	ggg	ctc	acc	ccg	gcg	gac	gtg	gac	gcc	gtc	1202
Gln	Ala	Leu	Ala	Asn	Ala	Gly	Leu	Thr	Pro	Ala	Asp	Val	Asp	Ala	Val	
			385				390					395				
gag	gcc	cac	ggc	acc	ggc	acc	agg	ctg	ggc	gac	ccc	atc	gag	gca	cag	1250
Glu	Ala	His	Gly	Thr	Gly	Thr	Arg	Leu	Gly	Asp	Pro	Ile	Glu	Ala	Gln	
			400			405					410					
gcg	gta	ctg	gcc	acc	tac	gga	cag	gag	cgc	gcc	acc	ccc	ctg	ctg	ctg	1298
Ala	Val	Leu	Ala	Thr	Tyr	Gly	Gln	Glu	Arg	Ala	Thr	Pro	Leu	Leu	Leu	
					420					425					430	
ggc	tcg	ctg	aag	tcc	aac	atc	ggc	cac	gcc	cag	gcc	gcg	tcc	ggc	gtc	1346
Gly	Ser	Leu	Lys	Ser	Asn	Ile	Gly	His	Ala	Gln	Ala	Ala	Ser	Gly	Val	
				435					440					445		

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Ser Trp Ala Met Met Val Ser Leu Ala Val Trp Gln Ala Ala Gly	
675 680 685	
gtg cgg ccg gat gcg gtg atc ggc cat tcg cag ggt gag atc gcc gca	2114
Val Arg Pro Asp Ala Val Ile Gly His Ser Gln Gly Glu Ile Ala Ala	
690 695 700	
gct tgt gtg gcg ggt gcg gtg tca cgc gat gcc gcc cgg atc gtg	2162
Ala Cys Val Ala Gly Ala Val Ser Leu Arg Asp Ala Ala Arg Ile Val	
705 710 715	
acc ttg cgc agc cag gcg atc gcc cgg ggc ctg gcg gcc cgg ggc gcg	2210
Thr Leu Arg Ser Gln Ala Ile Ala Arg Gly Leu Ala Gly Arg Gly Ala	
720 725 730	
atg gca tcc gtc gcc ctg ccc gcg cag gat gtc gag ctg gtc gac ggg	2258
Met Ala Ser Val Ala Leu Pro Ala Gln Asp Val Glu Leu Val Asp Gly	
735 740 745 750	
gcc tgg atc gcc gcc cac aac ggg ccc gcc tcc acc gtg atc gcg ggc	2306
Ala Trp Ile Ala Ala His Asn Gly Pro Ala Ser Thr Val Ile Ala Gly	
755 760 765	
acc ccg gaa gcg gtc gac cat gtc ctc acc gct cat gag gca caa ggg	2354
Thr Pro Glu Ala Val Asp His Val Leu Thr Ala His Glu Ala Gln Gly	
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gtg cgg gtg cgg cgg atc acc gtc gac tat gcc tcg cac acc ccg cac	2402
Val Arg Val Arg Arg Ile Thr Val Asp Tyr Ala Ser His Thr Pro His	
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gtc gag ctg atc cgc gac gaa cta ctc gac atc act agc gac agc agc	2450
Val Glu Leu Ile Arg Asp Glu Leu Leu Asp Ile Thr Ser Asp Ser Ser	
800 805 810	
tcg cag acc ccg ctc gtg ccg tgg ctg tcg acc gtg gac ggc acc tgg	2498
Ser Gln Thr Pro Leu Val Pro Trp Leu Ser Thr Val Asp Gly Thr Trp	
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Val Asp Ser Pro Leu Asp Gly Glu Tyr Trp Tyr Arg Asn Leu Arg Glu	
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ccg gtc ggt ttc cac ccc gcc gtc agc cag ttg cag gcc cag ggc gac	2594
Pro Val Gly Phe His Pro Ala Val Ser Gln Leu Gln Ala Gln Gly Asp	
850 855 860	
acc gtg ttc gtc gag gtc agc gcc agc ccg gtg ttg ttg cag gcg atg	2642
Thr Val Phe Val Glu Val Ser Ala Ser Pro Val Leu Leu Gln Ala Met	
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gac gac gat gtc gtc acg gtt gcc acg ctg cgt cgt gac gac ggc gac	2690
Asp Asp Asp Val Val Thr Val Ala Thr Leu Arg Arg Asp Asp Gly Asp	
880 885 890	

acc	acc	cgg	atg	ctc	acc	gcc	ctg	gca	cag	gcc	tat	gtc	cac	ggc	gtc	2738
Ala	Thr	Arg	Met	Leu	Thr	Ala	Leu	Ala	Gln	Ala	Tyr	Val	His	Gly	Val	
895					900					905					910	
acc	gtc	gac	tgg	ccc	gcc	atc	ctc	ggc	acc	acc	aca	acc	cgg	gta	ctg	2786
Thr	Val	Asp	Trp		Pro	Ala	Ile	Leu	Gly	Thr	Thr	Thr	Arg	Val	Leu	
				915						920				925		
gac	ctt	ccg	acc	tac	gcc	ttc	caa	cac	cag	cgg	tac	tgg	ctc	gag	tcg	2834
Asp	Leu	Pro	Thr	Tyr	Ala	Phe	Gln	His	Gln	Arg	Tyr	Trp	Leu	Glu	Ser	
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gca	cgc	ccg	gcc	gca	tcc	gac	gcg	ggc	cac	ccc	gtg	ctg	ggc	tcc	ggt	2882
Ala	Arg	Pro	Ala	Ala	Ser	Asp	Ala	Gly	His	Pro	Val	Leu	Gly	Ser	Gly	
		945					950					955				
atc	gcc	ctc	gcc	ggg	tcg	ccg	ggc	cgg	gtg	ttc	acg	ggg	tcc	gtg	ccg	2930
Ile	Ala	Leu	Ala	Gly	Ser	Pro	Gly	Arg	Val	Phe	Thr	Gly	Ser	Val	Pro	
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Thr	Gly	Ala	Asp	Arg	Ala	Val	Phe	Val	Ala	Glu	Leu	Ala	Leu	Ala	Ala	
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Ala	Asp	Ala	Val	Asp	Cys	Ala	Thr	Val	Glu	Arg	Leu	Asp	Ile	Ala	Ser	
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gtg	ccc	ggc	cgg	ccg	ggc	cat	ggc	cgg	acg	acc	gta	cag	acc	tgg	gtc	3074
Val	Pro	Gly		Pro	Gly	His	Gly	Arg	Thr	Thr	Val	Gln	Thr	Trp	Val	
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Asp	Glu	Pro	Ala	Asp	Asp	Gly	Arg	Arg	Arg	Phe	Thr	Val	His	Thr	Arg	
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Thr	Gly	Asp	Ala	Pro	Trp	Thr	Leu	His	Ala	Glu	Gly	Val	Leu	Arg	Pro	
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His	Gly	Thr	Ala	Leu	Pro	Asp	Ala	Ala	Asp	Ala	Glu	Trp	Pro	Pro	Pro	
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ggc	gcg	gtg	ccc	gcg	gac	ggg	ctg	ccg	ggt	gtg	tgg	cgc	cgg	ggg	gac	3266
Gly	Ala	Val	Pro	Ala	Asp	Gly	Leu	Pro	Gly	Val	Trp	Arg	Arg	Gly	Asp	
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cag	gtc	ttc	gcc	gag	gcc	gag	gtg	gac	gga	ccg	gac	ggt	phe	gtg	gtg	3314
Gln	Val	Phe	Ala	Glu	Ala	Glu	Val	Asp	Gly	Pro	Asp	Gly	Thr	Val	Val	
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 Arg Gln Pro Ala Gly Trp Arg Asp Leu Thr Val His Ala Ser Asp Ala
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acc gta ctg cgc gcc tgc ctc acc cgg cgc acc gac gga gcc atg gga 3458
 Thr Val Leu Arg Ala Cys Leu Thr Arg Arg Thr Asp Gly Ala Met Gly
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ttc gcc gcc ttc gac ggc gcc ggc ctg cgg gta ctc acc cgg gag cgg 3506
 Phe Ala Ala Phe Asp Gly Ala Gly Leu Pro Val Leu Thr Ala Glu Ala
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gtg acg ctg cgg gag gtg gcg tca ccg tcc ggc tcc gag gag tcg gac 3554
 Val Thr Leu Arg Glu Val Ala Ser Pro Ser Gly Ser Glu Ser Asp
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ggc ctg cac cgg ttg gag tgg ctc gcg gtc gcc gag cgg gtc tac gac 3602
 Gly Leu His Arg Leu Glu Trp Leu Ala Val Ala Glu Ala Val Tyr Asp
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ggt gac ctg ccc gag gga cat gtc ctg atc acc gcc gcc cac ccc gac 3650
 Gly Asp Leu Pro Glu Gly His Val Leu Ile Thr Ala Ala His Pro Asp
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gac ccc gag gac ata ccc acc cgc gcc cac acc cgc gcc acc cgc gtc 3698
 Asp Pro Glu Asp Ile Pro Thr Arg Ala His Thr Arg Ala Thr Arg Val
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ctg acc gcc ctg caa cac cac ctc acc acc acc gac cac acc ctc atc 3746
 Leu Thr Ala Leu Gln His His Leu Thr Thr Asp His Thr Leu Ile
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 Val His Thr Thr Thr Asp Pro Ala Gly Ala Thr Val Thr Gly Leu Thr
 1250 1255 1260

cgc acc gcc cag aac gaa cac ccc cac cgc atc cgc ctc atc gaa acc 3842
 Arg Thr Ala Gln Asn Glu His Pro His Arg Ile Arg Leu Ile Glu Thr
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gac cac ccc cac acc ccc ctc ccc ctg gcc caa ctc gcc acc ctc gac 3890
 Asp His Pro His Thr Pro Leu Pro Leu Ala Gln Leu Ala Thr Leu Asp
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cac ccc cac ctc cgc ctc acc cac cac acc ctc cac cac ccc cac ctc 3938
 His Pro His Leu Arg Leu Thr His His Thr Leu His His Pro His Leu
 1295 1300 1305 1310

acc ccc ctc cac acc acc acc cca ccc acc acc acc ccc ctc aac ccc 3986
 Thr Pro Leu His Thr Thr Pro Pro Thr Thr Thr Pro Leu Asn Pro
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gaa cac gcc atc atc atc acc ggc ggc tcc ggc acc ctc gcc ggc atc 4034
 Glu His Ala Ile Ile Thr Gly Gly Ser Gly Thr Leu Ala Gly Ile
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Leu Ala Arg His Leu Asn His Pro His Thr Tyr Leu Leu Ser Arg Thr
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cca ccc ccc gac gcc acc ccc gcc acc cac ctc ccc tgc gac gtc gcc 4130
Pro Pro Pro Asp Ala Thr Pro Gly Thr His Leu Pro Cys Asp Val Gly
1360 1365 1370

gac ccc cac caa ctc gcc acc acc ctc acc cac atc ccc caa ccc ctc 4178
Asp Pro His Gln Leu Ala Thr Thr Leu Thr His Ile Pro Gln Pro Leu
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acc gcc atc ttc cac acc gcc gcc acc ctc gac gac gcc atc ctc cac 4226
Thr Ala Ile Phe His Thr Ala Ala Thr Leu Asp Asp Gly Ile Leu His
1395 1400 1405

gcc ctc acc ccc gac cgc ctc acc acc gtc ctc cac ccc aaa gcc aac 4274
Ala Leu Thr Pro Asp Arg Leu Thr Thr Val Leu His Pro Lys Ala Asn
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gcc gcc tgg cac ctg cac cac ctc acc caa aac caa ccc ctc acc cac 4322
Ala Ala Trp His Leu His His Leu Thr Gln Asn Gln Pro Leu Thr His
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ttc gtc ctc tac tcc agc gcc gcc gcc gtc ctc gcc agc ccc gga caa 4370
Phe Val Leu Tyr Ser Ser Ala Ala Val Leu Gly Ser Pro Gly Gln
1440 1445 1450

gga aac tac gcc gcc gcc aac gcc ttc ctc gac gcc ctc gcc acc cac 4418
Gly Asn Tyr Ala Ala Ala Asn Ala Phe Leu Asp Ala Leu Ala Thr His
1455 1460 1465 1470

cgc cac acc ctc gcc caa ccc gcc acc tcc atc gcc tgg gcc atg tgg 4466
Arg His Thr Leu Gly Gln Pro Ala Thr Ser Ile Ala Trp Gly Met Trp
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cac acc acc agc acc ctc acc gga caa ctc gac gac gcc gac cgg gac 4514
His Thr Thr Ser Thr Leu Thr Gly Gln Leu Asp Asp Ala Asp Arg Asp
1490 1495 1500

cgc atc cgc cgc gcc ggt ttc ctc ccg atc acg gac gac gag gcc 4559
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atggggatgc at 4571

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<211> 1517

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic PKS
synthase fragment

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 20 25 30
 Lys Asp Leu Gly Ile Asp Ser Leu Thr Ala Val Gln Leu Arg Asn Ala
 35 40 45
 Leu Thr Glu Ala Thr Gly Val Arg Leu Asn Ala Thr Ala Val Phe Asp
 50 55 60
 Phe Pro Thr Pro His Val Leu Ala Gly Lys Leu Gly Asp Glu Leu Thr
 65 70 75 80
 Gly Thr Arg Ala Pro Val Val Pro Arg Thr Ala Ala Thr Ala Gly Ala
 85 90 95
 His Asp Glu Pro Leu Ala Ile Val Gly Met Ala Cys Arg Leu Pro Gly
 100 105 110
 Gly Val Ala Ser Pro Glu Glu Leu Trp His Leu Val Ala Ser Gly Thr
 115 120 125
 Asp Ala Ile Thr Glu Phe Pro Thr Asp Arg Gly Trp Asp Val Asp Ala
 130 135 140
 Ile Tyr Asp Pro Asp Pro Asp Ala Ile Gly Lys Thr Phe Val Arg His
 145 150 155 160
 Gly Gly Phe Leu Thr Gly Ala Thr Gly Phe Asp Ala Ala Phe Phe Gly
 165 170 175
 Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Val Leu
 180 185 190
 Leu Glu Thr Ser Trp Glu Ala Phe Glu Ser Ala Gly Ile Thr Pro Asp
 195 200 205
 Ser Thr Arg Gly Ser Asp Thr Gly Val Phe Val Gly Ala Phe Ser Tyr
 210 215 220
 Gly Tyr Gly Thr Gly Ala Asp Thr Asp Gly Phe Gly Ala Thr Gly Ser
 225 230 235 240
 Gln Thr Ser Val Leu Ser Gly Arg Leu Ser Tyr Phe Tyr Gly Leu Glu
 245 250 255
 Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala
 260 265 270
 Leu His Gln Ala Gly Gln Ser Leu Arg Ser Gly Glu Cys Ser Leu Ala
 275 280 285
 Leu Val Gly Gly Val Thr Val Met Ala Ser Pro Gly Gly Phe Val Glu
 290 295 300

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Phe	Ser	Arg	Gln	Arg	Gly	Leu	Ala	Pro	Asp	Gly	Arg	Ala	Lys	Ala	Phe
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Gly	Ala	Gly	Ala	Asp	Gly	Thr	Ser	Phe	Ala	Glu	Gly	Ala	Gly	Val	Leu
				325					330					335	
Ile	Val	Glu	Arg	Leu	Ser	Asp	Ala	Glu	Arg	Asn	Gly	His	Thr	Val	Leu
			340						345				350		
Ala	Val	Val	Arg	Gly	Ser	Ala	Val	Asn	Gln	Asp	Gly	Ala	Ser	Asn	Gly
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Leu	Ser	Ala	Pro	Asn	Gly	Pro	Ser	Gln	Glu	Arg	Val	Ile	Arg	Gln	Ala
			370			375					380				
Leu	Ala	Asn	Ala	Gly	Leu	Thr	Pro	Ala	Asp	Val	Asp	Ala	Val	Glu	Ala
385					390					395				400	
His	Gly	Thr	Gly	Thr	Arg	Leu	Gly	Asp	Pro	Ile	Glu	Ala	Gln	Ala	Val
				405					410					415	
Leu	Ala	Thr	Tyr	Gly	Gln	Glu	Arg	Ala	Thr	Pro	Leu	Leu	Leu	Gly	Ser
			420						425				430		
Leu	Lys	Ser	Asn	Ile	Gly	His	Ala	Gln	Ala	Ala	Ser	Gly	Val	Ala	Gly
			435				440					445			
Ile	Ile	Lys	Met	Val	Gln	Ala	Leu	Arg	His	Gly	Glu	Leu	Pro	Pro	Thr
			450			455					460				
Leu	His	Ala	Asp	Glu	Pro	Ser	Pro	His	Val	Asp	Trp	Thr	Ala	Gly	Ala
465					470					475					480
Val	Glu	Leu	Leu	Thr	Ser	Ala	Arg	Pro	Trp	Pro	Glu	Thr	Asp	Arg	Pro
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Arg	Arg	Ala	Gly	Val	Ser	Ser	Phe	Gly	Val	Ser	Gly	Thr	Asn	Ala	His
			500					505					510		
Val	Ile	Leu	Glu	Ser	Ala	Pro	Pro	Ala	Gln	Pro	Ala	Glu	Glu	Ala	Gln
			515				520					525			
Pro	Val	Glu	Thr	Pro	Val	Val	Ala	Ser	Asp	Val	Leu	Pro	Leu	Val	Ile
						535					540				
Ser	Ala	Lys	Thr	Gln	Pro	Ala	Leu	Thr	Glu	His	Glu	Asp	Arg	Leu	Arg
545					550					555					560
Ala	Tyr	Leu	Ala	Ala	Ser	Pro	Gly	Ala	Asp	Ile	Arg	Ala	Val	Ala	Ser
				565					570					575	
Thr	Leu	Ala	Val	Thr	Arg	Ser	Val	Phe	Glu	His	Arg	Ala	Val	Leu	Leu
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Gly	Asp	Asp	Thr	Val	Thr	Gly	Thr	Ala	Val	Thr	Asp	Pro	Arg	Ile	Val
		595					600					605			

Phe Val Phe Pro Gly Gln Gly Trp Gln Trp Leu Gly Met Gly Ser Ala
 610 615 620
 Leu Arg Asp Ser Ser Val Val Phe Ala Glu Arg Met Ala Glu Cys Ala
 625 630 635 640
 Ala Ala Leu Arg Glu Phe Val Asp Trp Asp Leu Phe Thr Val Leu Asp
 645 650 655
 Asp Pro Ala Val Val Asp Arg Val Asp Val Val Gln Pro Ala Ser Trp
 660 665 670
 Ala Met Met Val Ser Leu Ala Ala Val Trp Gln Ala Ala Gly Val Arg
 675 680 685
 Pro Asp Ala Val Ile Gly His Ser Gln Gly Glu Ile Ala Ala Ala Cys
 690 695 700
 Val Ala Gly Ala Val Ser Leu Arg Asp Ala Ala Arg Ile Val Thr Leu
 705 710 715 720
 Arg Ser Gln Ala Ile Ala Arg Gly Leu Ala Gly Arg Gly Ala Met Ala
 725 730 735
 Ser Val Ala Leu Pro Ala Gln Asp Val Glu Leu Val Asp Gly Ala Trp
 740 745 750
 Ile Ala Ala His Asn Gly Pro Ala Ser Thr Val Ile Ala Gly Thr Pro
 755 760 765
 Glu Ala Val Asp His Val Leu Thr Ala His Glu Ala Gln Gly Val Arg
 770 775 780
 Val Arg Arg Ile Thr Val Asp Tyr Ala Ser His Thr Pro His Val Glu
 785 790 795 800
 Leu Ile Arg Asp Glu Leu Leu Asp Ile Thr Ser Asp Ser Ser Ser Gln
 805 810 815
 Thr Pro Leu Val Pro Trp Leu Ser Thr Val Asp Gly Thr Trp Val Asp
 820 825 830
 Ser Pro Leu Asp Gly Glu Tyr Trp Tyr Arg Asn Leu Arg Glu Pro Val
 835 840 845
 Gly Phe His Pro Ala Val Ser Gln Leu Gln Ala Gln Gly Asp Thr Val
 850 855 860
 Phe Val Glu Val Ser Ala Ser Pro Val Leu Leu Gln Ala Met Asp Asp
 865 870 875 880
 Asp Val Val Thr Val Ala Thr Leu Arg Arg Asp Asp Gly Asp Ala Thr
 885 890 895
 Arg Met Leu Thr Ala Leu Ala Gln Ala Tyr Val His Gly Val Thr Val
 900 905 910

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Pro	Thr	Tyr	Ala	Phe	Gln	His	Gln	Arg	Tyr	Trp	Leu	Glu	Ser	Ala	Arg
930						935						940			
Pro	Ala	Ala	Ser	Asp	Ala	Gly	His	Pro	Val	Leu	Gly	Ser	Gly	Ile	Ala
945				950						955				960	
Leu	Ala	Gly	Ser	Pro	Gly	Arg	Val	Phe	Thr	Gly	Ser	Val	Pro	Thr	Gly
				965				970						975	
Ala	Asp	Arg	Ala	Val	Phe	Val	Ala	Glu	Leu	Ala	Leu	Ala	Ala	Ala	Asp
		980						985				990			
Ala	Val	Asp	Cys	Ala	Thr	Val	Glu	Arg	Leu	Asp	Ile	Ala	Ser	Val	Pro
		995				1000						1005			
Gly	Arg	Pro	Gly	His	Gly	Arg	Thr	Thr	Val	Gln	Thr	Trp	Val	Asp	Glu
1010						1015						1020			
Pro	Ala	Asp	Asp	Gly	Arg	Arg	Arg	Phe	Thr	Val	His	Thr	Arg	Thr	Gly
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Asp	Ala	Pro	Trp	Thr	Leu	His	Ala	Glu	Gly	Val	Leu	Arg	Pro	His	Gly
		1045						1050						1055	
Thr	Ala	Leu	Pro	Asp	Ala	Ala	Asp	Ala	Glu	Trp	Pro	Pro	Pro	Gly	Ala
		1060						1065				1070			
Val	Pro	Ala	Asp	Gly	Leu	Pro	Gly	Val	Trp	Arg	Arg	Gly	Asp	Gln	Val
		1075				1080						1085			
Phe	Ala	Glu	Ala	Glu	Val	Asp	Gly	Pro	Asp	Gly	Phe	Val	Val	His	Pro
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Asp	Leu	Leu	Asp	Ala	Val	Phe	Ser	Ala	Val	Gly	Asp	Gly	Ser	Arg	Gln
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Pro	Ala	Gly	Trp	Arg	Asp	Leu	Thr	Val	His	Ala	Ser	Asp	Ala	Thr	Val
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Leu	Arg	Ala	Cys	Leu	Thr	Arg	Arg	Thr	Asp	Gly	Ala	Met	Gly	Phe	Ala
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Ala	Phe	Asp	Gly	Ala	Gly	Leu	Pro	Val	Leu	Thr	Ala	Glu	Ala	Val	Thr
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Leu	Arg	Glu	Val	Ala	Ser	Pro	Ser	Gly	Ser	Glu	Glu	Ser	Asp	Gly	Leu
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His	Arg	Leu	Glu	Trp	Leu	Ala	Val	Ala	Glu	Ala	Val	Tyr	Asp	Gly	Asp
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Leu	Pro	Glu	Gly	His	Val	Leu	Ile	Thr	Ala	Ala	His	Pro	Asp	Asp	Pro
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Glu Asp Ile Pro Thr Arg Ala His Thr Arg Ala Thr Arg Val Leu Thr
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 Ala Leu Gln His His Leu Thr Thr Thr Asp His Thr Leu Ile Val His
 1235 1240 1245
 Thr Thr Thr Asp Pro Ala Gly Ala Thr Val Thr Gly Leu Thr Arg Thr
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 Ala Gln Asn Glu His Pro His Arg Ile Arg Leu Ile Glu Thr Asp His
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 Pro His Thr Pro Leu Pro Leu Ala Gln Leu Ala Thr Leu Asp His Pro
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 His Leu Arg Leu Thr His His Thr Leu His His Pro His Leu Thr Pro
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 Leu His Thr Thr Thr Pro Pro Thr Thr Thr Pro Leu Asn Pro Glu His
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 Arg His Leu Asn His Pro His Thr Tyr Leu Leu Ser Arg Thr Pro Pro
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 Pro Asp Ala Thr Pro Gly Thr His Leu Pro Cys Asp Val Gly Asp Pro
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 His Gln Leu Ala Thr Thr Leu Thr His Ile Pro Gln Pro Leu Thr Ala
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aac	gcc	ctc	acc	gag	gcg	acc	ggt	gtg	cgg	ctg	aac	gcc	acg	gcg	gtc	194
Asn	Ala	Leu	Thr	Glu	Ala	Thr	Gly	Val	Arg	Leu	Asn	Ala	Thr	Ala	Val	
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Phe	Asp	Phe	Pro	Thr	Pro	His	Val	Leu	Ala	Gly	Lys	Leu	Gly	Asp	Glu	
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Leu	Thr	Gly	Thr	Arg	Ala	Pro	Val	Val	Pro	Arg	Thr	Ala	Ala	Thr	Ala	
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Pro	Gly	Gly	Val	Ala	Ser	Pro	Glu	Glu	Leu	Trp	His	Leu	Val	Ala	Ser	
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ggc	acc	gac	gcc	atc	acg	gag	ttc	cgg	acg	gac	cgc	ggc	tgg	gac	gtc	434
Gly	Thr	Asp	Ala	Ile	Thr	Glu	Phe	Pro	Thr	Asp	Arg	Gly	Trp	Asp	Val	
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Asp	Ala	Ile	Tyr	Asp	Pro	Asp	Pro	Asp	Ala	Ile	Gly	Lys	Thr	Phe	Val	
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Arg	His	Gly	Gly	Phe	Leu	Thr	Gly	Ala	Thr	Gly	Phe	Asp	Ala	Ala	Phe	
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Gln Ala Leu Ala Asn Ala Gly Leu Thr Pro Ala Asp Val Asp Ala Val
385 390 395

gag gcc cac ggc acc ggc acc agg ctg ggc gac ccc atc gag gca cag	1250
Glu Ala His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln	
400 405 410	
gcg gta ctg gcc acc tac gga cag gag cgc gcc acc ccc ctg ctg ctg	1298
Ala Val Leu Ala Thr Tyr Gly Gln Glu Arg Ala Thr Pro Leu Leu Leu	
415 420 425 430	
ggc tcg ctg aag tcc aac atc ggc cac gcc cag gcc cgc tcc ggc gtc	1346
Gly Ser Leu Lys Ser Asn Ile Gly His Ala Gln Ala Ala Ser Gly Val	
435 440 445	
gcc gcc atc atc aag atg gtg cag gcc ctg cgg cac ggg gag ctg ccg	1394
Ala Gly Ile Ile Lys Met Val Gln Ala Leu Arg His Gly Glu Leu Pro	
450 455 460	
ccg acg ctg cac gcc gac gag cgg tcg ccg cac gtc gac tgg acg gcc	1442
Pro Thr Leu His Ala Asp Glu Pro Ser Pro His Val Asp Trp Thr Ala	
465 470 475	
ggc gcc gtc gaa ctg ctg acg tcg gcc cgg ccg tgg ccc gag acc gac	1490
Gly Ala Val Glu Leu Leu Thr Ser Ala Arg Pro Trp Pro Glu Thr Asp	
480 485 490	
cgg cca cgg cgt gcc gcc gtc tcc tcg ttc ggg gtg agc gcc acc aac	1538
Arg Pro Arg Arg Ala Ala Val Ser Ser Phe Gly Val Ser Gly Thr Asn	
495 500 505 510	
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Ala His Val Ile Leu Glu Ala Gly Pro Val Thr Glu Thr Pro Ala Ala	
515 520 525	
tcg cct tcc ggt gac ctt ccc ctg ctg gtg tcg gca cgc tca ccg gaa	1634
Ser Pro Ser Gly Asp Leu Pro Leu Val Ser Ala Arg Ser Pro Glu	
530 535 540	
gcg ctg gac gag cag atc cgc cga ctg cgc gcc tac ctg gac acc acc	1682
Ala Leu Asp Glu Gln Ile Arg Arg Leu Arg Ala Tyr Leu Asp Thr Thr	
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Pro Asp Val Asp Arg Val Ala Val Ala Gln Thr Leu Ala Arg Arg Thr	
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cac ttc gcc cac cgc gcc gtg ctg ctg ggt gac acc gtc atc acc aca	1778
His Phe Ala His Arg Ala Val Leu Leu Gly Asp Thr Val Ile Thr Thr	
575 580 585 590	
ccc ccc cgc gac cgg ccc gac gaa ctg gtc ttc gtc tac tcc ggc cag	1826
Pro Pro Ala Asp Arg Pro Asp Glu Leu Val Phe Val Tyr Ser Gly Gln	
595 600 605	
ggc acc cag cat ccc cgc atg ggc gag cag cta gcc gcc cgc ttc ccc	1874
Gly Thr Gln His Pro Ala Met Gly Glu Gln Leu Ala Ala Phe Pro	
610 615 620	

gat	ttc	gcg	cgg	atc	cat	cag	cag	gtg	tgg	gac	ctg	ctc	gat	gtg	ccc	1922
Val	Phe	Ala	Arg	Ile	His	Gln	Gln	Val	Trp	Asp	Leu	Leu	Asp	Val	Pro	
	640	625					630					635				
gat	ctg	gag	gtg	aac	gag	acc	ggt	tac	gcc	cag	ccg	gcc	ctg	ttc	gca	1970
Asp	Leu	Glu	Val	Asn	Glu	Thr	Gly	Tyr	Ala	Gln	Pro	Ala	Leu	Phe	Ala	
	640					645					650					
atg	cag	gtg	gct	ctg	ttc	ggg	ctg	ctg	gaa	tcg	tgg	ggg	gta	cga	ccg	2018
Met	Gln	Val	Ala	Leu	Phe	Gly	Leu	Leu	Glu	Ser	Trp	Gly	Val	Arg	Pro	
	655				660					665					670	
gac	gcg	gtg	atc	ggc	cat	tcg	gtg	ggt	gag	ctt	gcg	gct	gcg	tat	gtg	2066
Asp	Ala	Val	Ile	Gly	His	Ser	Val	Gly	Glu	Leu	Ala	Ala	Ala	Tyr	Val	
				675					680					685		
tcc	ggg	gtg	tgg	tcg	ttg	gag	gat	gcc	tgc	act	ttg	gtg	tcg	gcg	cgg	2114
Ser	Gly	Val	Trp	Ser	Leu	Glu	Asp	Ala	Cys	Thr	Leu	Val	Ser	Ala	Arg	
			690					695					700			
gct	cgt	ctg	atg	cag	gct	ctg	ccc	gcg	ggt	ggg	gtg	atg	gtc	gct	gtc	2162
Ala	Arg	Leu	Met	Gln	Ala	Leu	Pro	Ala	Gly	Gly	Val	Met	Val	Ala	Val	
		705					710					715				
ccg	gtc	tcg	gag	gat	gag	gcc	cgg	gcc	gtg	ctg	ggt	gag	ggg	gtg	gag	2210
Pro	Val	Ser	Glu	Asp	Glu	Ala	Arg	Ala	Val	Leu	Gly	Glu	Gly	Val	Glu	
	720					725					730					
atc	gcc	gcg	gtc	aac	ggc	ccg	tcg	tcg	gtg	gtt	ctc	tcc	ggg	gat	gag	2258
Ile	Ala	Ala	Val	Asn	Gly	Pro	Ser	Ser	Val	Val	Leu	Ser	Gly	Asp	Glu	
	735				740					745					750	
gcc	gcc	gtg	ctg	cag	gcc	gcg	gag	ggg	ctg	ggg	aag	tgg	acg	cgg	ctg	2306
Ala	Ala	Val	Leu	Gln	Ala	Ala	Glu	Gly	Leu	Gly	Lys	Trp	Thr	Arg	Leu	
				755					760					765		
gcg	acc	agc	cac	gcg	ttc	cat	tcc	gcc	cgt	atg	gaa	ccc	atg	ctg	gag	2354
Ala	Thr	Ser	His	Ala	Phe	His	Ser	Ala	Arg	Met	Glu	Pro	Met	Leu	Glu	
			770					775					780			
gag	ttc	cgg	gcg	gtc	gcc	gaa	ggc	ctg	acc	tac	cgg	acg	ccg	cag	gtc	2402
Glu	Phe	Arg	Ala	Val	Ala	Glu	Gly	Leu	Thr	Tyr	Arg	Thr	Pro	Gln	Val	
	785						790				795					
tcc	atg	gcc	ggt	ggt	gat	cag	gtg	acc	acc	gct	gag	tac	tgg	gtg	cgg	2450
Ser	Met	Ala	Val	Gly	Asp	Gln	Val	Thr	Thr	Ala	Glu	Tyr	Trp	Val	Arg	
	800					805					810					
cag	gtc	cgg	gac	acg	gtc	cgg	ttc	ggc	gag	cag	gtg	gcc	tcg	tac	gag	2498
Gln	Val	Arg	Asp	Thr	Val	Arg	Phe	Gly	Glu	Gln	Val	Ala	Ser	Tyr	Glu	
	815															

gtc Val	gac Asp	ggc Gly	gtc Val	gcg Ala	atg Met	ctg Leu	cac His	ggc Gly	gac Asp	cac His	gaa Glu	atc Ile	cag Gln	gcc Ala	gcg Ala	2594
atc Ile	ggc Gly	gcc Ala	ctg Leu	gcc Ala	cac His	ctg Leu	tat Tyr	gtc Val	aac Asn	ggc Gly	gtc Val	acg Thr	gtc Val	gac Asp	tgg Trp	2642
ccc Pro	gcg Ala	ctc Leu	ctg Leu	ggc Gly	gat Asp	gct Ala	ccg Pro	gca Ala	aca Thr	cgg Arg	gtg Val	ctg Leu	gac Asp	ctt Leu	ccg Pro	2690
aca Thr	tac Tyr	gcc Ala	ttc Phe	cag Gln	cac His	cag Gln	cgc Arg	tac Tyr	tgg Trp	ctc Leu	gag Glu	tcg Ser	gca Ala	cgc Arg	ccg Pro	2738
gcc Ala	gca Ala	tcc Ser	gac Asp	gcg Gly	ggc Gly	cac His	ccc Pro	gtg Val	ctg Leu	ggc Gly	tcc Ser	ggc Gly	atc Ile	gcc Ala	ctc Leu	2786
gcc Ala	ggg Gly	tcg Ser	ccg Pro	ggc Gly	cgg Arg	gtg Val	ttc Phe	acg Thr	ggc Gly	tcc Ser	gtg Val	ccg Pro	acc Thr	ggc Gly	gcg Ala	2834
gac Asp	cgc Arg	gcg Ala	gtg Val	ttc Phe	gtc Val	gcc Ala	gag Glu	ctg Leu	gcg Ala	ctg Leu	gcc Ala	gcc Ala	gcg Ala	gac Asp	gcg Ala	2882
gtc Val	gac Asp	tgc Cys	gcc Ala	acg Thr	gtc Val	gtc Val	cgg Glu	ctc Leu	gac Asp	atc Ile	gcc Ala	tcc Ser	gtg Val	ccc Pro	ggc Gly	2930
cgg Arg	ccg Pro	ggc Gly	cat His	ggc Gly	cgg Arg	acg Thr	acc Thr	gta Val	cag Gln	acc Thr	tgg Trp	gtc Val	gac Asp	gag Glu	ccg Pro	2978
gcg Ala	gac Asp	gac Asp	ggc Gly	cgg Arg	cgc Arg	cgg Arg	ttc Phe	acc Thr	gtg Val	cac His	acc Thr	cgc Arg	acc Thr	ggc Gly	gac Asp	3026
gcc Ala	ccg Pro	tgg Trp	acg Thr	ctg Leu	cac His	gcc Ala	gag Glu	ggg Gly	gtg Val	ctg Leu	cgc Arg	ccc Pro	cat His	ggc Gly	acg Thr	3074
gcc Ala	ctg Leu	ccc Pro	gat Asp	gcg Ala	gcc Ala	gac Asp	gca Ala	gag Glu	tgg Trp	ccc Pro	cca Pro	ccg Pro	ggc Gly	gcg Ala	gtg Val	3122
ccc Pro	gcg Ala	gac Asp	ggg Gly	ctg Leu	ccg Pro	ggt Gly	gtg Val	tgg Trp	cgc Arg	cgg Arg	ggg Gly	gac Gly	cag Gln	gtc Val	ttc Phe	3170
gcc Ala	gag Glu	gcc Ala	gag Glu	gtg Val	gac Asp	gga Gly	ccg Pro	gac Asp	ggc Gly	ttc Phe	gtg Val	gtg Val	cac His	ccc Pro	gac Asp	3218

Arg	cct	gac	gcg	gcc	ttc	tcc	gcg	gtc	ggc	gac	gga	agc	cgc	cag	ccg	
Leu	Leu	Asp	Ala	Val	Phe	Ser	Ala	Val	Gly	Asp	Gly	Ser	Arg	Gln	Pro	3266
1075																
gcc	gga	tgg	cgc	gac	ctg	acg	gtg	cac	gcg	tcg	gac	gcc	acc	gta	ctg	3314
Ala	Gly	Trp	Arg	Asp	Leu	Thr	Val	His	Ala	Ser	Asp	Ala	Thr	Val	Leu	
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1085																
cgc	gcc	tgc	ctc	acc	cgg	cgc	acc	gac	gga	gcc	atg	gga	ttc	gcc	gcc	3362
Arg	Ala	Cys	Leu	Thr	Arg	Arg	Thr	Asp	Gly	Ala	Met	Gly	Phe	Ala	Ala	
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1110																
1115																
ttc	gac	ggc	gcc	ggc	ctg	ccg	gta	ctc	acc	gcg	gag	gcg	gtg	acg	ctg	3410
Phe	Asp	Gly	Ala	Gly	Leu	Pro	Val	Leu	Thr	Ala	Glu	Ala	Val	Thr	Leu	
1120																
1125																
1130																
cgg	gag	gtg	gcg	tca	ccg	tcc	ggc	tcc	gag	gag	tcg	gac	ggc	ctg	cac	3458
Arg	Glu	Val	Ala	Ser	Pro	Ser	Gly	Ser	Glu	Glu	Ser	Asp	Gly	Leu	His	
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1140																
1145																
cgg	ttg	gag	tgg	ctc	gcg	gtc	gcc	gag	gcg	gtc	tac	gac	ggt	gac	ctg	3506
Arg	Leu	Glu	Trp	Leu	Ala	Val	Ala	Glu	Ala	Val	Tyr	Asp	Gly	Asp	Leu	
1155																
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ccc	gag	gga	cat	gtc	ctg	atc	acc	gcc	gcc	cac	ccc	gac	gac	ccc	gag	3554
Pro	Glu	Gly	His	Val	Leu	Ile	Thr	Ala	Ala	His	Pro	Asp	Asp	Pro	Glu	
1170																
1175																
1180																
gac	ata	ccc	acc	cgc	gcc	cac	acc	cgc	gcc	acc	cgc	gtc	ctg	acc	gcc	3602
Asp	Ile	Pro	Thr	Arg	Ala	His	Thr	Arg	Ala	Thr	Arg	Val	Leu	Thr	Ala	
1185																
1190																
1195																
ctg	caa	cac	cac	ctc	acc	acc	acc	gac	cac	acc	ctc	atc	gtc	cac	acc	3650
Leu	Gln	His	His	Leu	Thr	Thr	Thr	Asp	His	Thr	Leu	Ile	Val	His	Thr	
1200																
1205																
1210																
acc	acc	gac	ccc	gcc	ggc	gcc	acc	gac	acc	ggc	ctc	acc	cgc	acc	gcc	3698
Thr	Thr	Asp	Pro	Ala	Gly	Ala	Thr	Val	Thr	Gly	Leu	Thr	Arg	Thr	Ala	
1215																
1220																
1225																
1230																
cag	aac	gaa	cac	ccc	cac	cgc	atc	cgc	ctc	atc	gaa	acc	gac	cac	ccc	3746
Gln	Asn	Glu	His	Pro	His	Arg	Ile	Arg	Leu	Ile	Glu	Thr	Asp	His	Pro	
1235																
1240																
1245																
cac	acc	ccc	ctc	ccc	ctg	gcc	caa	ctc	gcc	acc	ctc	gac	cac	ccc	cac	3794
His	Thr	Pro	Leu	Pro	Leu	Ala	Gln	Leu	Ala	Thr	Leu	Asp	His	Pro	His	
1250																
1255																
1260																
ctc	cgc	ctc	acc	cac	cac	acc	ctc	cac	cac	ccc	cac	ctc	acc	ccc	ctc	3842
Leu	Arg	Leu	Thr	His	His	Thr	Leu	His	His	Pro	His	Leu	Thr	Pro	Leu	
1265																
1270																
1275																
cac	acc	acc	acc	cca	ccc	acc	acc	acc	ccc	ctc	aac	ccc	gaa	cac	gcc	3890
His	Thr	Thr	Thr	Pro	Pro	Thr	Thr	Thr	Pro	Leu	Asn	Pro	Glu	His	Ala	
1280																
1285																
1290																

<400> 21

Gln Leu Ala Glu Ala Leu Leu Thr Leu Val Arg Glu Ser Thr Ala Ala
 1 5 10 15
 Val Leu Gly His Val Gly Gly Glu Asp Ile Pro Ala Thr Ala Ala Phe
 20 25 30
 Lys Asp Leu Gly Ile Asp Ser Leu Thr Ala Val Gln Leu Arg Asn Ala
 35 40 45
 Leu Thr Glu Ala Thr Gly Val Arg Leu Asn Ala Thr Ala Val Phe Asp
 50 55 60
 Phe Pro Thr Pro His Val Leu Ala Gly Lys Leu Gly Asp Glu Leu Thr
 65 70 75 80
 Gly Thr Arg Ala Pro Val Val Pro Arg Thr Ala Ala Thr Ala Gly Ala
 85 90 95
 His Asp Glu Pro Leu Ala Ile Val Gly Met Ala Cys Arg Leu Pro Gly
 100 105 110
 Gly Val Ala Ser Pro Glu Glu Leu Trp His Leu Val Ala Ser Gly Thr
 115 120 125
 Asp Ala Ile Thr Glu Phe Pro Thr Asp Arg Gly Trp Asp Val Asp Ala
 130 135 140
 Ile Tyr Asp Pro Asp Pro Asp Ala Ile Gly Lys Thr Phe Val Arg His
 145 150 155 160
 Gly Gly Phe Leu Thr Gly Ala Thr Gly Phe Asp Ala Ala Phe Phe Gly
 165 170 175
 Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Val Leu
 180 185 190
 Leu Glu Thr Ser Trp Glu Ala Phe Glu Ser Ala Gly Ile Thr Pro Asp
 195 200 205
 Ser Thr Arg Gly Ser Asp Thr Gly Val Phe Val Gly Ala Phe Ser Tyr
 210 215 220
 Gly Tyr Gly Thr Gly Ala Asp Thr Asp Gly Phe Gly Ala Thr Gly Ser
 225 230 235 240
 Gln Thr Ser Val Leu Ser Gly Arg Leu Ser Tyr Phe Tyr Gly Leu Glu
 245 250 255
 Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala
 260 265 270
 Leu His Gln Ala Gly Gln Ser Leu Arg Ser Gly Glu Cys Ser Leu Ala
 275 280 285
 Leu Val Gly Gly Val Thr Val Met Ala Ser Pro Gly Gly Phe Val Glu
 290 295 300

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Phe 305	Ser	Arg	Gln	Arg	Gly 310	Leu	Ala	Pro	Asp	Gly 315	Arg	Ala	Lys	Ala	Phe 320
Gly	Ala	Gly	Ala	Asp 325	Gly	Thr	Ser	Phe	Ala 330	Glu	Gly	Ala	Gly	Val 335	Leu
Ile	Val	Glu	Arg 340	Leu	Ser	Asp	Ala	Glu	Arg 345	Asn	Gly	His	Thr 350	Val	Leu
Ala	Val	Val	Arg 355	Gly	Ser	Ala	Val 360	Asn	Gln	Asp	Gly 365	Ala	Ser	Asn	Gly
Leu	Ser 370	Ala	Pro	Asn	Gly 375	Pro	Ser	Gln	Glu	Arg	Val 380	Ile	Arg	Gln	Ala
Leu 385	Ala	Asn	Ala	Gly 390	Leu	Thr	Pro	Ala	Asp 395	Val	Asp	Ala	Val	Glu	Ala 400
His	Gly	Thr	Gly 405	Thr	Arg	Leu	Gly	Asp	Pro 410	Ile	Glu	Ala	Gln	Ala 415	Val
Leu	Ala	Thr	Tyr 420	Gly	Gln	Glu	Arg	Ala 425	Thr	Pro	Leu	Leu	Leu 430	Gly	Ser
Leu	Lys	Ser	Asn 435	Ile	Gly	His	Ala 440	Gln	Ala	Ala	Ser	Gly 445	Val	Ala	Gly
Ile 450	Ile	Lys	Met	Val	Gln	Ala 455	Leu	Arg	His	Gly 460	Glu	Leu	Pro	Pro	Thr
Leu 465	His	Ala	Asp 470	Glu	Pro	Ser	Pro	His	Val 475	Asp	Trp	Thr	Ala	Gly 480	Ala
Val	Glu	Leu	Leu 485	Thr	Ser	Ala	Arg	Pro	Trp 490	Pro	Glu	Thr	Asp	Arg 495	Pro
Arg	Arg	Ala	Ala 500	Val	Ser	Ser	Phe	Gly 505	Val	Ser	Gly	Thr	Asn 510	Ala	His
Val	Ile 515	Leu	Glu	Ala	Gly	Pro	Val 520	Thr	Glu	Thr	Pro	Ala 525	Ala	Ser	Pro
Ser	Gly 530	Asp	Leu	Pro	Leu 535	Leu	Val	Ser	Ala	Arg 540	Ser	Pro	Glu	Ala	Leu
Asp 545	Glu	Gln	Ile	Arg 550	Leu	Arg	Ala	Tyr	Leu 555	Asp	Thr	Thr	Pro	Asp 560	
Val	Asp	Arg	Val 565	Ala	Val	Ala	Gln	Thr	Leu 570	Ala	Arg	Arg	Thr	His 575	Phe
Ala	His	Arg	Ala 580	Val	Leu	Leu	Gly	Asp 585	Thr	Val	Ile	Thr	Thr 590	Pro	Pro
Ala	Asp 595	Arg	Pro	Asp	Glu	Leu	Val 600	Phe	Val	Tyr	Ser	Gly 605	Gln	Gly	Thr

Gln His Pro Ala Met Gly Glu Gln Leu Ala Ala Phe Pro Val Phe
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 Ala Arg Ile His Gln Gln Val Trp Asp Leu Leu Asp Val Pro Asp Leu
 625 630 635 640
 Glu Val Asn Glu Thr Gly Tyr Ala Gln Pro Ala Leu Phe Ala Met Gln
 645 650 655
 Val Ala Leu Phe Gly Leu Leu Glu Ser Trp Gly Val Arg Pro Asp Ala
 660 665 670
 Val Ile Gly His Ser Val Gly Glu Leu Ala Ala Ala Tyr Val Ser Gly
 675 680 685
 Val Trp Ser Leu Glu Asp Ala Cys Thr Leu Val Ser Ala Arg Ala Arg
 690 695 700
 Leu Met Gln Ala Leu Pro Ala Gly Gly Val Met Val Ala Val Pro Val
 705 710 715 720
 Ser Glu Asp Glu Ala Arg Ala Val Leu Gly Glu Gly Val Glu Ile Ala
 725 730 735
 Ala Val Asn Gly Pro Ser Ser Val Val Leu Ser Gly Asp Glu Ala Ala
 740 745 750
 Val Leu Gln Ala Ala Glu Gly Leu Gly Lys Trp Thr Arg Leu Ala Thr
 755 760 765
 Ser His Ala Phe His Ser Ala Arg Met Glu Pro Met Leu Glu Glu Phe
 770 775 780
 Arg Ala Val Ala Glu Gly Leu Thr Tyr Arg Thr Pro Gln Val Ser Met
 785 790 795 800
 Ala Val Gly Asp Gln Val Thr Thr Ala Glu Tyr Trp Val Arg Gln Val
 805 810 815
 Arg Asp Thr Val Arg Phe Gly Glu Gln Val Ala Ser Tyr Glu Asp Ala
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 Val Phe Val Glu Leu Gly Ala Asp Arg Ser Leu Ala Arg Leu Val Asp
 835 840 845
 Gly Val Ala Met Leu His Gly Asp His Glu Ile Gln Ala Ala Ile Gly
 850 855 860
 Ala Leu Ala His Leu Tyr Val Asn Gly Val Thr Val Asp Trp Pro Ala
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 Leu Leu Gly Asp Ala Pro Ala Thr Arg Val Leu Asp Leu Pro Thr Tyr
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 Ala Phe Gln His Gln Arg Tyr Trp Leu Glu Ser Ala Arg Pro Ala Ala
 900 905 910

Ser Asp Ala Gly His Pro Val Leu Gly Ser Gly Ile Ala Leu Ala Gly
 915 920 925
 Ser Pro Gly Arg Val Phe Thr Gly Ser Val Pro Thr Gly Ala Asp Arg
 930 935 940
 Ala Val Phe Val Ala Glu Leu Ala Leu Ala Ala Ala Asp Ala Val Asp
 945 950 955 960
 Cys Ala Thr Val Glu Arg Leu Asp Ile Ala Ser Val Pro Gly Arg Pro
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 Gly His Gly Arg Thr Thr Val Gln Thr Trp Val Asp Glu Pro Ala Asp
 980 985 990
 Asp Gly Arg Arg Arg Phe Thr Val His Thr Arg Thr Gly Asp Ala Pro
 995 1000 1005
 Trp Thr Leu His Ala Glu Gly Val Leu Arg Pro His Gly Thr Ala Leu
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 Pro Asp Ala Ala Asp Ala Glu Trp Pro Pro Gly Ala Val Pro Ala
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 Cys Leu Thr Arg Arg Thr Asp Gly Ala Met Gly Phe Ala Ala Phe Asp
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 Val Ala Ser Pro Ser Gly Ser Glu Glu Ser Asp Gly Leu His Arg Leu
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 Glu Trp Leu Ala Val Ala Glu Ala Val Tyr Asp Gly Asp Leu Pro Glu
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 Gly His Val Leu Ile Thr Ala Ala His Pro Asp Asp Pro Glu Asp Ile
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 Pro Thr Arg Ala His Thr Arg Ala Thr Arg Val Leu Thr Ala Leu Gln
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 His His Leu Thr Thr Thr Asp His Thr Leu Ile Val His Thr Thr Thr
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Asp Pro Ala Gly Ala Thr Val Thr Gly Leu Thr Arg Thr Ala Gln Asn
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 Glu His Pro His Arg Ile Arg Leu Ile Glu Thr Asp His Pro His Thr
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 Pro Leu Pro Leu Ala Gln Leu Ala Thr Leu Asp His Pro His Leu Arg
 1250 1255 1260
 Leu Thr His His Thr Leu His His Pro His Leu Thr Pro Leu His Thr
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 Thr Thr Pro Pro Thr Thr Thr Pro Leu Asn Pro Glu His Ala Ile Ile
 1285 1290 1295
 Ile Thr Gly Gly Ser Gly Thr Leu Ala Gly Ile Leu Ala Arg His Leu
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 Asn His Pro His Thr Tyr Leu Leu Ser Arg Thr Pro Pro Pro Asp Ala
 1315 1320 1325
 Thr Pro Gly Thr His Leu Pro Cys Asp Val Gly Asp Pro His Gln Leu
 1330 1335 1340
 Ala Thr Thr Leu Thr His Ile Pro Gln Pro Leu Thr Ala Ile Phe His
 345 1350 1355 1360
 Thr Ala Ala Thr Leu Asp Asp Gly Ile Leu His Ala Leu Thr Pro Asp
 1365 1370 1375
 Arg Leu Thr Thr Val Leu His Pro Lys Ala Asn Ala Ala Trp His Leu
 1380 1385 1390
 His His Leu Thr Gln Asn Gln Pro Leu Thr His Phe Val Leu Tyr Ser
 1395 1400 1405
 Ser Ala Ala Ala Val Leu Gly Ser Pro Gly Gln Gly Asn Tyr Ala Ala
 1410 1415 1420
 Ala Asn Ala Phe Leu Asp Ala Leu Ala Thr His Arg His Thr Leu Gly
 425 1430 1435 1440
 Gln Pro Ala Thr Ser Ile Ala Trp Gly Met Trp His Thr Thr Ser Thr
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 Leu Thr Gly Gln Leu Asp Asp Ala Asp Arg Asp Arg Ile Arg Arg Gly
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 Gly Phe Leu Pro Ile Thr Asp Asp Glu Gly
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<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: DNA encoding synthetic
PKS synthase fragment

<220>

<221> CDS

<222> (9)..(4535)

<400> 22

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Ala Ala Val Leu Gly His Val Gly Gly Glu Asp Ile Pro Ala Thr Ala
  15             20             25             30

gcg ttc aag gac ctc gcc atc gac tcg ctc acc gcg gtc cag ctg cgc 146
Ala Phe Lys Asp Leu Gly Ile Asp Ser Leu Thr Ala Val Gln Leu Arg
    35             40             45

aac gcc ctc acc gag gcg acc ggt gtg cgg ctg aac gcc acg gcg gtc 194
Asn Ala Leu Thr Glu Ala Thr Gly Val Arg Leu Asn Ala Thr Ala Val
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ttc gac ttc ccg acc ccg cac gtg ctc gcc ggg aag ctc gcc gac gaa 242
Phe Asp Phe Pro Thr Pro His Val Leu Ala Gly Lys Leu Gly Asp Glu
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ctg acc gcc acc cgc gcg ccc gtc gtg ccc cgg acc gcg gcc acg gcc 290
Leu Thr Gly Thr Arg Ala Pro Val Val Pro Arg Thr Ala Ala Thr Ala
    80             85             90

ggt gcg cac gac gag ccg ctg gcg atc gtg gga atg gcc tgc cgg ctg 338
Gly Ala His Asp Glu Pro Leu Ala Ile Val Gly Met Ala Cys Arg Leu
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ccc gcc ggg gtc gcg tca ccc gag gag ctg tgg cac ctc gtg gca tcc 386
Pro Gly Gly Val Ala Ser Pro Glu Glu Leu Trp His Leu Val Ala Ser
    115            120            125

ggc acc gac gcc atc acg gag ttc ccg acg gac cgc gcc tgg gac gtc 434
Gly Thr Asp Ala Ile Thr Glu Phe Pro Thr Asp Arg Gly Trp Asp Val
    130            135            140

gac gcg atc tac gac ccg gac ccc gac gcg atc gcc aag acc ttc gtc 482
Asp Ala Ile Tyr Asp Pro Asp Pro Asp Ala Ile Gly Lys Thr Phe Val
    145            150            155

cgg cac ggt gcc ttc ctc acc gcc gcg aca gcc ttc gac gcg gcg ttc 530
Arg His Gly Gly Phe Leu Thr Gly Ala Thr Gly Phe Asp Ala Ala Phe
    160            165            170

ttc gcc atc agc ccg cgc gag gcc ctc gcg atg gac ccg cag cag cgg 578
Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg
    175            180            185            190

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Val	Leu	Leu	Glu	Thr	Ser	Trp	Glu	Ala	Phe	Glu	Ser	Ala	Gly	Ile	Thr	
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ccg	gac	tcg	acc	cgc	ggc	agc	gac	acc	ggc	gtg	ttc	gtc	ggc	gcc	ttc	674
Pro	Asp	Ser	Thr	Arg	Gly	Ser	Asp	Thr	Gly	Val	Phe	Val	Gly	Ala	Phe	
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ttc	tac	ggt	tac	ggc	acc	ggt	gcg	gac	acc	gac	ggc	ttc	ggc	gcg	acc	722
Ser	Tyr	Gly	Tyr	Gly	Thr	Gly	Ala	Asp	Thr	Asp	Gly	Phe	Gly	Ala	Thr	
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Gly	Ser	Gln	Thr	Ser	Val	Leu	Ser	Gly	Arg	Leu	Ser	Tyr	Phe	Tyr	Gly	
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Leu	Glu	Gly	Pro	Ala	Val	Thr	Val	Asp	Thr	Ala	Cys	Ser	Ser	Ser	Leu	
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Val	Ala	Leu	His	Gln	Ala	Gly	Gln	Ser	Leu	Arg	Ser	Gly	Glu	Cys	Ser	
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ctc	gcc	ctg	gtc	ggc	ggc	gtc	acg	gtg	cgc	tcg	ccc	ggc	ggc	ttc		914
Leu	Ala	Leu	Val	Gly	Gly	Val	Thr	Val	Met	Ala	Ser	Pro	Gly	Gly	Phe	
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Val	Glu	Phe	Ser	Arg	Gln	Arg	Gly	Leu	Ala	ccg	asp	Gly	Arg	Ala	Lys	
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Val	Leu	Ile	Val	Glu	Arg	Leu	Ser	Asp	Ala	Glu	Arg	Asn	Gly	His	Thr	
		335			340					345				350		
gtc	ctg	gcg	gtc	gtc	cgt	ggt	tcg	gcg	gtc	aac	cag	gat	ggt	gcc	tcc	1106
Val	Leu	Ala	Val	Val	Arg	Gly	Ser	Ala	Val	Asn	Gln	Asp	Gly	Ala	Ser	
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aac	ggg	ctg	tcg	gcg	ccg	aac	ggg	ccg	tcg	cag	gag	cgg	gtg	atc	cgg	1154
Asn	Gly	Leu	Ser	Ala	Pro	Asn	Gly	Pro	Ser	Gln	Glu	Arg	Val	Ile	Arg	
			370					375					380			
cag	gcc	ctg	gcc	aac	gcc	ggg	ctc	acc	ccg	gcg	gac	gtg	gac	gcc	gtc	1202
Gln	Ala	Leu	Ala	Asn	Ala	Gly	Leu	Thr	Pro	Ala	Asp	Val	Asp	Ala	Val	
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Glu	Ala	His	Gly	Thr	Gly	Thr	Arg	Leu	Gly	Asp	Pro	Ile	Glu	Ala	Gln	
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Ala Val Leu Ala Thr Tyr Gly Gln Glu Arg Ala Thr Pro Leu Leu Leu	
415 420 425 430	
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Gly Ser Leu Lys Ser Asn Ile Gly His Ala Gln Ala Ala Ser Gly Val	
435 440 445	
gcc gcc atc atc aag atg gtg cag gcc ctc cgg cac ggg gag ctg ccg	1394
Ala Gly Ile Ile Lys Met Val Gln Ala Leu Arg His Gly Glu Leu Pro	
450 455 460	
ccg acg ctg cac gcc gac gag ccg tcg ccg cac gtc gac tgg acg gcc	1442
Pro Thr Leu His Ala Asp Glu Pro Ser Pro His Val Asp Trp Thr Ala	
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Gly Ala Val Glu Leu Leu Thr Ser Ala Arg Pro Trp Pro Glu Thr Asp	
480 485 490	
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Arg Pro Arg Arg Ala Ala Val Ser Ser Phe Gly Val Ser Gly Thr Asn	
495 500 505 510	
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Ala His Val Ile Leu Glu Ala Gly Pro Val Thr Glu Thr Pro Ala Ala	
515 520 525	
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Ser Pro Ser Gly Asp Leu Pro Leu Leu Val Ser Ala Arg Ser Pro Glu	
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Ala Leu Asp Glu Gln Ile Arg Arg Leu Arg Ala Tyr Leu Asp Thr Thr	
545 550 555	
ccg gac gtc gac cgg gtg gcc gtg gca cag acg ctg gcc ccg cgc aca	1730
Pro Asp Val Asp Arg Val Ala Val Ala Gln Thr Leu Ala Arg Arg Thr	
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cac ttc gcc cac cgc gcc gtg ctg ctc ggt gac acc gtc atc acc aca	1778
His Phe Ala His Arg Ala Val Leu Leu Gly Asp Thr Val Ile Thr Thr	
575 580 585 590	
ccc ccc gcg gac cgg ccc gac gaa ctc gtc ttc gtc tac tcc ggc cag	1826
Pro Pro Ala Asp Arg Pro Asp Glu Leu Val Phe Val Tyr Ser Gly Gln	
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Gly Thr Gln His Pro Ala Met Gly Glu Gln Leu Ala Asp Ser Ser Val	
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gtg ttc gcc gag cgg atg gcc gag tgt gcg gcg gcg ttg cgc gag ttc	1922
Val Phe Ala Glu Arg Met Ala Glu Cys Ala Ala Ala Leu Arg Glu Phe	
625 630 635	

0940315.082701

gtg Val	gac Asp	tgg Trp	gat Asp	ctg Leu	ttc Phe	acg Thr	gtt Val	ctg Leu	gat Asp	gat Asp	ccg Pro	gcg Ala	gtg Val	gtg Val	gac Asp	1970
cgg Arg	gtt Val	gat Asp	gtg Val	gtc Val	cag Gln	ccc Pro	gct Ala	tcc Ser	tgg Trp	gcg Ala	atg Met	atg Met	gtt Val	tcc Ser	ctg Leu	2018
gcc Ala	gcg Ala	gtg Val	tgg Trp	cag Gln	gcg Ala	gcc Ala	ggt Gly	gtg Val	cgg Arg	ccg Pro	gat Asp	gcg Ala	gtg Val	atc Ile	ggc Gly	2066
cat His	tcg Ser	cag Gln	ggt Gly	gag Glu	atc Ile	gcc Ala	gca Ala	gct Ala	tgt Cys	gtg Val	gcg Ala	ggc Gly	ctg Val	tca Ser		2114
cta Leu	cgc Arg	gat Asp	gcc Ala	gcc Ala	cgg Arg	atc Ile	gtg Val	acc Thr	ttg Leu	cgc Arg	agc Ser	cag Gln	gcg Ala	atc Ile	gcc Ala	2162
cgg Arg	ggc Gly	ctg Leu	gcg Ala	ggc Gly	cgg Arg	ggc Gly	gcg Ala	atg Met	gca Ala	tcc Ser	gtc Val	gcc Ala	ctg Leu	ccc Pro	gcg Ala	2210
cag Gln	gat Asp	gtc Val	gag Glu	ctg Leu	gtc Val	gac Asp	ggg Gly	gcc Ala	tgg Trp	atc Ile	gcc Ala	gcc Ala	cac His	aac Asn	ggg Gly	2258
ccc Pro	gcc Ala	tcc Ser	acc Thr	gtg Val	atc Ile	gcg Ala	ggc Gly	acc Thr	ccg Pro	gaa Glu	gcg Ala	gtc Val	gac Asp	cat His	gtc Val	2306
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gac Asp	tat Tyr	gcc Ala	tcg Ser	cac His	acc Thr	ccg Pro	cac His	gtc Val	gag Glu	ctg Leu	atc Ile	cgc Arg	gac Asp	gaa Glu	cta Leu	2402
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Ser	Pro	Val	Leu	Leu	Gln	Ala	Met	Asp	Asp	Asp	Val	Val	Thr	Val	Ala	
		865					870					875				
acg	ctg	cgt	cgt	gac	gac	ggc	gac	gcc	acc	cgg	atg	ctc	acc	gcc	ctg	2690
Thr	Leu	Arg	Arg	Asp	Asp	Gly	Asp	Ala	Thr	Arg	Met	Leu	Thr	Ala	Leu	
	880					885					890					
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Ala	Gln	Ala	Tyr	Val	His	Gly	Val	Thr	Val	Asp	Trp	Pro	Ala	Ile	Leu	
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Gly	Thr	Thr	Thr	Thr	Arg	Val	Leu	Asp	Leu	Pro	Thr	Tyr	Ala	Phe	Gln	
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His	Gln	Arg	Tyr	Trp	Leu	Glu	Ser	Ala	Arg	Pro	Ala	Ala	Ser	Asp	Ala	
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ggc	cac	ccc	gtg	ctg	ggc	tcc	ggc	atc	gcc	ctc	gcc	ggg	tcg	ccg	ggc	2882
Gly	His	Pro	Val	Leu	Gly	Ser	Gly	Ile	Ala	Leu	Ala	Gly	Ser	Pro	Gly	
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cgg	gtg	ttc	acg	ggc	tcc	gtg	ccg	acc	ggc	gcg	gac	cgc	gcg	gtg	ttc	2930
Arg	Val	Phe	Thr	Gly	Ser	Val	Pro	Thr	Gly	Ala	Asp	Arg	Ala	Val	Phe	
	960					965					970					
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Val	Ala	Glu	Leu	Ala	Leu	Ala	Ala	Ala	Asp	Ala	Val	Asp	Cys	Ala	Thr	
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Val	Glu	Arg	Leu	Asp	Ile	Ala	Ser	Val	Pro	Gly	Arg	Pro	Gly	His	Gly	
				995					1000					1005		
cgg	acg	acc	gta	cag	acc	tgg	gtc	gac	gag	cgg	gcg	gac	gac	ggc	cgg	3074
Arg	Thr	Thr	Val	Gln	Thr	Trp	Val	Asp	Glu	Pro	Ala	Asp	Asp	Gly	Arg	
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Arg	Arg	Phe	Thr	Val	His	Thr	Arg	Thr	Gly	Asp	Ala	Pro	Trp	Thr	Leu	
		1025					1030					1035				
cac	gcc	gag	ggg	gtg	ctg	cgc	ccc	cat	ggc	acg	gcc	ctg	ccc	gat	gcg	3170
His	Ala	Glu	Gly	Val	Leu	Arg	Pro	His	Gly	Thr	Ala	Leu	Pro	Asp	Ala	
	1040					1045				1050						
gcc	gac	gcc	gag	tgg	ccc	cca	ccg	ggc	gcg	gtg	ccc	gcg	gac	ggg	ctg	3218
Ala	Asp	Ala	Glu	Trp	Pro	Pro	Pro	Gly	Ala	Val	Pro	Ala	Asp	Gly	Leu	
	1055				1060				1065					1070		
cgg	ggc	gtg	tgg	cgc	cgg	ggg	gac	cag	gtc	ttc	gcc	gag	gcc	gag	gtg	3266
Pro	Gly	Val	Trp	Arg	Arg	Gly	Asp	Gln	Val	Phe	Ala	Glu	Ala	Glu	Val	
				1075				1080						1085		

0040345.002701

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Asp Gly Pro Asp Gly Phe Val Val His Pro Asp Leu Leu Asp Ala Val	
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Phe Ser Ala Val Gly Asp Gly Ser Arg Gln Pro Ala Gly Trp Arg Asp	
1105 1110 1115	
ctg acg gtg cac gcg tcg gac gcc acc gta ctg cgc gcc tgc ctc acc	3410
Leu Thr Val His Ala Ser Asp Ala Thr Val Leu Arg Ala Cys Leu Thr	
1120 1125 1130	
cgg cgc acc gac gga gcc atg gga ttc gcc gcc ttc gac gcc gcc gcc	3458
Arg Arg Thr Asp Gly Ala Met Gly Phe Ala Ala Phe Asp Gly Ala Gly	
1135 1140 1145 1150	
ctg ccg gta ctc acc gcg gag gcg gtg acg ctg ccg gag gtg gcg tca	3506
Leu Pro Val Leu Thr Ala Glu Ala Val Thr Leu Arg Glu Val Ala Ser	
1155 1160 1165	
ccg tcc ggc tcc gag gag tcg gac gcc ctg cac ccg ttg gag tgg ctc	3554
Pro Ser Gly Ser Glu Glu Ser Asp Gly Leu His Arg Leu Glu Trp Leu	
1170 1175 1180	
gcg gtc gcc gag gcg gtc tac gac ggt gac ctg ccc gag gga cat gtc	3602
Ala Val Ala Glu Ala Val Tyr Asp Gly Asp Leu Pro Glu Gly His Val	
1185 1190 1195	
ctg atc acc gcc cac ccc gac gac ccc gag gac ata ccc acc cgc	3650
Leu Ile Thr Ala Ala His Pro Asp Asp Pro Glu Asp Ile Pro Thr Arg	
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Ala His Thr Arg Ala Thr Arg Val Leu Thr Ala Leu Gln His His Leu	
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Thr Thr Thr Asp His Thr Leu Ile Val His Thr Thr Thr Asp Pro Ala	
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Gly Ala Thr Val Thr Gly Leu Thr Arg Thr Ala Gln Asn Glu His Pro	
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cac cgc atc cgc ctc atc gaa acc gac cac ccc cac acc ccc ctc ccc	3842
His Arg Ile Arg Leu Ile Glu Thr Asp His Pro His Thr Pro Leu Pro	
1265 1270 1275	
ctg gcc caa ctc gcc acc ctc gac cac ccc cac ctc cgc ctc acc cac	3890
Leu Ala Gln Leu Ala Thr Leu Asp His Pro His Leu Arg Leu Thr His	
1280 1285 1290	
cac acc ctc cac cac ccc cac ctc acc ccc ctc cac acc acc acc cca	3938
His Thr Leu His His Pro His Leu Thr Pro Leu His Thr Thr Thr Pro	
1295 1300 1305 1310	

ccc acc acc acc ccc ctc aac ccc gaa cac gcc atc atc atc acc ggc 3986
 Pro Thr Thr Thr Pro Leu Asn Pro Glu His Ala Ile Ile Ile Thr Gly
 1315 1320 1325

ggc tcc ggc acc ctc gcc ggc atc ctc gcc cgc cac ctg aac cac ccc 4034
 Gly Ser Gly Thr Leu Ala Gly Ile Leu Ala Arg His Leu Asn His Pro
 1330 1335 1340

cac acc tac ctc ctc tcc cgc acc cca ccc ccc gac gcc acc ccc ggc 4082
 His Thr Tyr Leu Leu Ser Arg Thr Pro Pro Pro Asp Ala Thr Pro Gly
 1345 1350 1355

acc cac ctc ccc tgc gac gtc ggc gac ccc cac caa ctc gcc acc acc 4130
 Thr His Leu Pro Cys Asp Val Gly Asp Pro His Gln Leu Ala Thr Thr
 1360 1365 1370

ctc acc cac atc ccc caa ccc ctc acc gcc atc ttc cac acc gcc gcc 4178
 Leu Thr His Ile Pro Gln Pro Leu Thr Ala Ile Phe His Thr Ala Ala
 1375 1380 1385 1390

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 Thr Leu Asp Asp Gly Ile Leu His Ala Leu Thr Pro Asp Arg Leu Thr
 1395 1400 1405

acc gtc ctc cac ccc aaa gcc aac gcc gcc tgg cac ctg cac cac ctc 4274
 Thr Val Leu His Pro Lys Ala Asn Ala Ala Trp His Leu His His Leu
 1410 1415 1420

acc caa aac caa ccc ctc acc cac ttc gtc ctc tac tcc agc gcc gcc 4322
 Thr Gln Asn Gln Pro Leu Thr His Phe Val Leu Tyr Ser Ser Ala Ala
 1425 1430 1435

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 Ala Val Leu Gly Ser Pro Gly Gln Gly Asn Tyr Ala Ala Ala Asn Ala
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 Phe Leu Asp Ala Leu Ala Thr His Arg His Thr Leu Gly Gln Pro Ala
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acc tcc atc gcc tgg ggc atg tgg cac acc acc agc acc ctc acc gga 4466
 Thr Ser Ile Ala Trp Gly Met Trp His Thr Thr Ser Thr Leu Thr Gly
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 Gln Leu Asp Asp Ala Asp Arg Asp Arg Ile Arg Arg Gly Gly Phe Leu
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ccg atc acg gac gac gag ggc atggggatgc at 4547
 Pro Ile Thr Asp Asp Glu Gly
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<210> 23

<211> 1509

<212> PRT

<213> Artificial Sequence

09440316-082701

<223> Description of Artificial Sequence: Synthetic PKS synthase fragment

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Val Leu Gly His Val Gly Gly Glu Asp Ile Pro Ala Thr Ala Ala Phe
20 25 30

Lys Asp Leu Gly Ile Asp Ser Leu Thr Ala Val Gln Leu Arg Asn Ala
35 40 45

Leu Thr Glu Ala Thr Gly Val Arg Leu Asn Ala Thr Ala Val Phe Asp
50 55 60

Phe Pro Thr Pro His Val Leu Ala Gly Lys Leu Gly Asp Glu Leu Thr
65 70 75 80

Gly Thr Arg Ala Pro Val Val Pro Arg Thr Ala Ala Thr Ala Gly Ala
85 90 95

His Asp Glu Pro Leu Ala Ile Val Gly Met Ala Cys Arg Leu Pro Gly
100 105 110

Gly Val Ala Ser Pro Glu Glu Leu Trp His Leu Val Ala Ser Gly Thr
115 120 125

Asp Ala Ile Thr Glu Phe Pro Thr Asp Arg Gly Trp Asp Val Asp Ala
130 135 140

Ile Tyr Asp Pro Asp Pro Asp Ala Ile Gly Lys Thr Phe Val Arg His
145 150 155 160

Gly Gly Phe Leu Thr Gly Ala Thr Gly Phe Asp Ala Ala Phe Phe Gly
165 170 175

Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Val Leu
180 185 190

Leu Glu Thr Ser Trp Glu Ala Phe Glu Ser Ala Gly Ile Thr Pro Asp
195 200 205

Ser Thr Arg Gly Ser Asp Thr Gly Val Phe Val Gly Ala Phe Ser Tyr
210 215 220

Gly Tyr Gly Thr Gly Ala Asp Thr Asp Gly Phe Gly Ala Thr Gly Ser
225 230 235 240

Gln Thr Ser Val Leu Ser Gly Arg Leu Ser Tyr Phe Tyr Gly Leu Glu
245 250 255

Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala
260 265 270

Leu His Gln Ala Gly Gln Ser Leu Arg Ser Gly Glu Cys Ser Leu Ala
 275 280 285
 Leu Val Gly Gly Val Thr Val Met Ala Ser Pro Gly Gly Phe Val Glu
 290 295 300
 Phe Ser Arg Gln Arg Gly Leu Ala Pro Asp Gly Arg Ala Lys Ala Phe
 305 310 315 320
 Gly Ala Gly Ala Asp Gly Thr Ser Phe Ala Glu Gly Ala Gly Val Leu
 325 330 335
 Ile Val Glu Arg Leu Ser Asp Ala Glu Arg Asn Gly His Thr Val Leu
 340 345 350
 Ala Val Val Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly
 355 360 365
 Leu Ser Ala Pro Asn Gly Pro Ser Gln Glu Arg Val Ile Arg Gln Ala
 370 375 380
 Leu Ala Asn Ala Gly Leu Thr Pro Ala Asp Val Asp Ala Val Glu Ala
 385 390 395 400
 His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala Val
 405 410 415
 Leu Ala Thr Tyr Gly Gln Glu Arg Ala Thr Pro Leu Leu Leu Gly Ser
 420 425 430
 Leu Lys Ser Asn Ile Gly His Ala Gln Ala Ala Ser Gly Val Ala Gly
 435 440 445
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 Leu His Ala Asp Glu Pro Ser Pro His Val Asp Trp Thr Ala Gly Ala
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 Val Glu Leu Leu Thr Ser Ala Arg Pro Trp Pro Glu Thr Asp Arg Pro
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 Val Ile Leu Glu Ala Gly Pro Val Thr Glu Thr Pro Ala Ala Ser Pro
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 Ser Gly Asp Leu Pro Leu Leu Val Ser Ala Arg Ser Pro Glu Ala Leu
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 Asp Glu Gln Ile Arg Arg Leu Arg Ala Tyr Leu Asp Thr Thr Pro Asp
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Ala His Arg Ala Val Leu Leu Gly Asp Thr Val Ile Thr Thr Pro Pro
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Ala Asp Arg Pro Asp Glu Leu Val Phe Val Tyr Ser Gly Gln Gly Thr
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Gln His Pro Ala Met Gly Glu Gln Leu Ala Asp Ser Ser Val Val Phe
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Trp Asp Leu Phe Thr Val Leu Asp Asp Pro Ala Val Val Asp Arg Val
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Asp Val Val Gln Pro Ala Ser Trp Ala Met Met Val Ser Leu Ala Ala
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Gln Gly Glu Ile Ala Ala Ala Cys Val Ala Gly Ala Val Ser Leu Arg
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Ser Thr Val Ile Ala Gly Thr Pro Glu Ala Val Asp His Val Leu Thr
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Ala His Glu Ala Gln Gly Val Arg Val Arg Arg Ile Thr Val Asp Tyr
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Ala Ser His Thr Pro His Val Glu Leu Ile Arg Asp Glu Leu Leu Asp
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Ile Thr Ser Asp Ser Ser Ser Gln Thr Pro Leu Val Pro Trp Leu Ser
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Thr Val Asp Gly Thr Trp Val Asp Ser Pro Leu Asp Gly Glu Tyr Trp
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Leu Gln Ala Gln Gly Asp Thr Val Phe Val Glu Val Ser Ala Ser Pro
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<221> CDS

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Val Ala Ala Ala Leu Asp Asp Ala Pro Asp Val Pro Leu Leu Arg Gly
              20              25              30

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Leu Arg Arg Thr Thr Val Arg Arg Ala Ala Val Arg Glu Arg Ser Leu
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gcc gac cgc tcg ccg tgc tgc ccg acg acg agc gcg ccg acg cct ccc     191
Ala Asp Arg Ser Pro Cys Cys Pro Thr Thr Ser Ala Pro Thr Pro Pro
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Ser Arg Ser Ser Trp Asn Ser Thr Ala Thr Val Leu Gly His Leu Gly
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Ser Leu Thr Ala Val Gln Leu Arg Asn Ala Leu Thr Thr Ala Thr Gly
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gta cgc ctc aac gcc aca gcg gtc ttc gac ttt ccg acg ccg cgc gcg     383
Val Arg Leu Asn Ala Thr Ala Val Phe Asp Phe Pro Thr Pro Arg Ala
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ctc gcc gcg aga ctc ggc gac gag ctg gcc ggt acc cgc gcg ccc gtc     431
Leu Ala Ala Arg Leu Gly Asp Glu Leu Ala Gly Thr Arg Ala Pro Val
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 Glu Thr His His Pro His Thr Pro Leu Pro Leu Thr Thr Leu Thr Thr
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ctc cac caa ccc cac cta cgc ctc acc aac aac acc ctc cac acc ccc 4079
 Leu His Gln Pro His Leu Arg Leu Thr Asn Asn Thr Leu His Thr Pro
 1345 1350 1355

cac ctc acc ccc atc acc acc cac cac aac acc acc aca acc acc ccc 4127
 His Leu Thr Pro Ile Thr Thr His His Asn Thr Thr Thr Thr Pro
 1360 1365 1370 1375

aac acc cca ccc ctc aac ccc aac cac gcc atc ctc atc acc gcc gcc 4175
 Asn Thr Pro Pro Leu Asn Pro Asn His Ala Ile Leu Ile Thr Gly Gly
 1380 1385 1390

tcc gcc acc ctc gcc gcc atc ctc gcc cgc cac ctc aac cac ccc cac 4223
 Ser Gly Thr Leu Ala Gly Ile Leu Ala Arg His Leu Asn His Pro His
 1395 1400 1405

acc tac ctc ctc tcc cgc aca cca cca ccc ccc acc aca ccc gcc acc 4271
 Thr Tyr Leu Leu Ser Arg Thr Pro Pro Pro Thr Thr Pro Gly Thr
 1410 1415 1420

cac atc ccc tgc gac ctc acc gac ccc acc caa atc acc caa gcc ctc 4319
 His Ile Pro Cys Asp Leu Thr Asp Pro Thr Gln Ile Thr Gln Ala Leu
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acc cac ata cca caa ccc ctc acc gcc atc ttc cac acc gcc gcc acc 4367
 Thr His Ile Pro Gln Pro Leu Thr Gly Ile Phe His Thr Ala Ala Thr
 1440 1445 1450 1455

ctc gac gac gcc acc ctc acc aac ctc acc ccc caa cac ctc acc acc 4415
 Leu Asp Asp Ala Thr Leu Thr Asn Leu Thr Pro Gln His Leu Thr Thr
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acc ctc caa ccc aaa gcc gac gcc gcc tgg cac ctc cac cac cac acc 4463
 Thr Leu Gln Pro Lys Ala Asp Ala Ala Trp His Leu His His His Thr
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Leu Thr Ala Val Gln Leu Arg Asn Ala Leu Thr Thr Ala Thr Gly Val
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Arg	Leu	Asn	Ala	Thr	Ala	Val	Phe	Asp	Phe	Pro	Thr	Pro	Arg	Ala	Leu
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Ala	Ala	Arg	Leu	Gly	Asp	Glu	Leu	Ala	Gly	Thr	Arg	Ala	Pro	Val	Ala
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Ala	Arg	Thr	Ala	Ala	Thr	Ala	Ala	Ala	His	Asp	Glu	Pro	Leu	Ala	Ile
145 150 155 160															
Val	Gly	Met	Ala	Cys	Arg	Leu	Pro	Gly	Gly	Val	Ala	Ser	Pro	Gln	Glu
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Leu	Trp	Arg	Leu	Val	Ala	Ser	Gly	Thr	Asp	Ala	Ile	Thr	Glu	Phe	Pro
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Ala	Asp	Arg	Gly	Trp	Asp	Val	Asp	Ala	Leu	Tyr	Asp	Pro	Asp	Pro	Asp
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Ala	Ile	Gly	Lys	Thr	Phe	Val	Arg	His	Gly	Gly	Phe	Leu	Asp	Gly	Ala
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Thr	Gly	Phe	Asp	Ala	Ala	Phe	Phe	Gly	Ile	Ser	Pro	Arg	Glu	Ala	Leu
225 230 235 240															
Ala	Met	Asp	Pro	Gln	Arg	Val	Leu	Leu	Glu	Thr	Ser	Trp	Glu	Ala	Ala
245 250 255															
Phe	Glu	Ser	Ala	Gly	Ile	Thr	Pro	Asp	Ala	Ala	Arg	Gly	Ser	Asp	Thr
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Gly	Val	Phe	Ile	Gly	Ala	Phe	Ser	Tyr	Gly	Tyr	Gly	Thr	Gly	Ala	Asp
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Thr	Asn	Gly	Phe	Gly	Ala	Thr	Gly	Ser	Gln	Thr	Ser	Val	Leu	Ser	Gly
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Arg	Leu	Ser	Tyr	Phe	Tyr	Gly	Leu	Glu	Gly	Pro	Ser	Val	Thr	Val	Asp
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370 375 380															
Ser	Phe	Ala	Glu	Gly	Ala	Gly	Ala	Leu	Val	Val	Glu	Arg	Leu	Ser	Asp
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Ala	Glu	Arg	His	Gly	His	Thr	Val	Leu	Ala	Leu	Val	Arg	Gly	Ser	Ala
405 410 415															

Ala Asn Ser Asp Gly Ala Ser Asn Gly Leu Ser Ala Pro Asn Gly Pro
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 Ser Gln Glu Arg Val Ile His Gln Ala Leu Ala Asn Ala Lys Leu Thr
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 Pro Ala Asp Val Asp Ala Val Glu Ala His Gly Thr Gly Thr Arg Leu
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 Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Gln Asp
 465 470 475 480
 Arg Ala Thr Pro Leu Leu Leu Gly Ser Leu Lys Ser Asn Ile Gly His
 485 490 495
 Ala Gln Ala Ala Ser Gly Val Ala Gly Ile Ile Lys Met Val Gln Ala
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 Ile Arg His Gly Glu Leu Pro Pro Thr Leu His Ala Asp Glu Pro Ser
 515 520 525
 Pro His Val Asp Trp Thr Ala Gly Ala Val Glu Leu Leu Thr Ser Ala
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 Arg Pro Trp Pro Gly Thr Gly Arg Pro Arg Arg Ala Ala Val Ser Ser
 545 550 555 560
 Phe Gly Val Ser Gly Thr Asn Ala His Ile Ile Leu Glu Ala Gly Pro
 565 570 575
 Val Lys Thr Gly Pro Val Glu Ala Gly Ala Ile Glu Ala Gly Pro Val
 580 585 590
 Glu Val Gly Pro Val Glu Ala Gly Pro Leu Pro Ala Ala Pro Pro Ser
 595 600 605
 Ala Pro Gly Glu Asp Leu Pro Leu Leu Val Ser Ala Arg Ser Pro Glu
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 Ala Leu Asp Glu Gln Ile Gly Arg Leu Arg Ala Tyr Leu Asp Thr Gly
 625 630 635 640
 Pro Gly Val Asp Arg Ala Ala Val Ala Gln Thr Leu Ala Arg Arg Thr
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 His Phe Thr His Arg Ala Val Leu Leu Gly Asp Thr Val Ile Gly Ala
 660 665 670
 Pro Pro Ala Asp Gln Ala Asp Glu Leu Val Phe Val Tyr Ser Gly Gln
 675 680 685
 Gly Thr Gln His Pro Ala Met Gly Glu Gln Leu Ala Ala Phe Pro
 690 695 700
 Val Phe Ala Asp Ala Trp His Asp Ala Leu Arg Arg Leu Asp Asp Pro
 705 710 715 720

Asp	Pro	His	Asp	Pro	Thr	Arg	Ser	Gln	His	Thr	Leu	Phe	Ala	His	Gln
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Ala	Ala	Phe	Thr	Ala	Leu	Leu	Arg	Ser	Trp	Asp	Ile	Thr	Pro	His	Ala
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Val	Ile	Gly	His	Ser	Leu	Gly	Glu	Ile	Thr	Ala	Ala	Tyr	Ala	Ala	Gly
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Ile	Leu	Ser	Leu	Asp	Asp	Ala	Cys	Thr	Leu	Ile	Thr	Thr	Arg	Ala	Arg
770								775				780			
Leu	Met	His	Thr	Leu	Pro	Pro	Pro	Gly	Ala	Met	Val	Thr	Val	Leu	Thr
785								790				795			
Ser	Glu	Glu	Glu	Ala	Arg	Gln	Ala	Leu	Arg	Pro	Gly	Val	Glu	Ile	Ala
805								810				815			
Ala	Val	Phe	Gly	Pro	His	Ser	Val	Val	Leu	Ser	Gly	Asp	Glu	Asp	Ala
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Val	Leu	Asp	Val	Ala	Gln	Arg	Leu	Gly	Ile	His	His	Arg	Leu	Pro	Ala
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Pro	His	Ala	Gly	His	Ser	Ala	His	Met	Glu	Pro	Val	Ala	Ala	Glu	Leu
850								855				860			
Leu	Ala	Thr	Thr	Arg	Glu	Leu	Arg	Tyr	Asp	Arg	Pro	His	Thr	Ala	Ile
865								870				875			
Pro	Asn	Asp	Pro	Thr	Thr	Ala	Glu	Tyr	Trp	Ala	Glu	Gln	Val	Arg	Asn
885								890				895			
Pro	Val	Leu	Phe	His	Ala	His	Thr	Gln	Arg	Tyr	Pro	Asp	Ala	Val	Phe
900								905				910			
Val	Glu	Ile	Gly	Pro	Gly	Gln	Asp	Leu	Ser	Pro	Leu	Val	Asp	Gly	Ile
915								920				925			
Ala	Leu	Gln	Asn	Gly	Thr	Ala	Asp	Glu	Val	His	Ala	Leu	His	Thr	Ala
930								935				940			
Leu	Ala	Arg	Leu	Phe	Thr	Arg	Gly	Ala	Thr	Leu	Asp	Trp	Ser	Arg	Ile
945								950				955			
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965								970				975			
Gln	Arg	Arg	Pro	Tyr	Trp	Ile	Glu	Ser	Ala	Pro	Pro	Ala	Thr	Ala	Asp
980								985				990			
Ser	Gly	His	Pro	Val	Leu	Gly	Thr	Gly	Val	Ala	Val	Ala	Gly	Ser	Pro
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Phe Ile Ala Glu Leu Ala Leu Ala Ala Asp Ala Thr Asp Cys Ala
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 Thr Val Glu Gln Leu Asp Val Thr Ser Val Pro Gly Gly Ser Ala Arg
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 Arg Arg Arg Phe Thr Val His Thr Arg Val Gly Asp Ala Pro Trp Thr
 1075 1080 1085
 Leu His Ala Glu Gly Val Leu Arg Pro Gly Arg Val Pro Gln Pro Glu
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 Leu Pro Gly Ala Trp Arg Arg Ala Asp Gln Val Phe Val Glu Ala Glu
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 Val Phe Ser Ala Val Gly Asp Gly Ser Arg Gln Pro Thr Gly Trp Arg
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 Asp Leu Ala Val His Ala Ser Asp Ala Thr Val Leu Arg Ala Cys Leu
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 Thr Arg Arg Asp Ser Gly Val Val Glu Leu Ala Ala Phe Asp Gly Ala
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 Gly Met Pro Val Leu Thr Ala Glu Ser Val Thr Leu Gly Glu Val Ala
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 Ser Ala Gly Gly Ser Asp Glu Ser Asp Gly Leu Leu Arg Leu Glu Trp
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 Leu Pro Val Ala Glu Ala His Tyr Asp Gly Ala Asp Glu Leu Pro Glu
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 Gly Tyr Thr Leu Ile Thr Ala Thr His Pro Asp Asp Pro Asp Asp Pro
 1250 1255 1260
 Thr Asn Pro His Asn Thr Pro Thr Arg Thr His Thr Gln Thr Thr Arg
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 Val Leu Thr Ala Leu Gln His His Leu Ile Thr Thr Asn His Thr Leu
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 Ile Val His Thr Thr Thr Asp Pro Pro Gly Ala Ala Val Thr Gly Leu
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 Thr Arg Thr Ala Gln Asn Glu His Pro Gly Arg Ile His Leu Ile Glu
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Thr His His Pro His Thr Pro Leu Pro Leu Thr Gln Leu Thr Thr Leu
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 His Gln Pro His Leu Arg Leu Thr Asn Asn Thr Leu His Thr Pro His
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Leu Thr Pro Ile Thr Thr His His Asn Thr Thr Thr Thr Pro Asn
 1365 1370 1375

Thr Pro Pro Leu Asn Pro Asn His Ala Ile Leu Ile Thr Gly Ser
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Gly Thr Leu Ala Gly Ile Leu Ala Arg His Leu Asn His Pro His Thr
 1395 1400 1405

Tyr Leu Leu Ser Arg Thr Pro Pro Pro Thr Thr Pro Gly Thr His
 1410 1415 1420

Ile Pro Cys Asp Leu Thr Asp Pro Thr Gln Ile Thr Gln Ala Leu Thr
 425 1430 1435 144

His Ile Pro Gln Pro Leu Thr Gly Ile Phe His Thr Ala Ala Thr Leu
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Asp Asp Ala Thr Leu Thr Asn Leu Thr Pro Gln His Leu Thr Thr Thr
 1460 1465 1470

Leu Gln Pro Lys Ala Asp Ala Ala Trp His Leu His His His Thr Gln
 1475 1480 1485

Asn Gln Pro Leu Thr His Phe Val Leu Tyr Ser Ser Ala Ala Ala Thr
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Leu Gly Ser Pro Gly Gln Ala Asn Tyr Ala Ala Ala Asn Ala Phe Leu
 505 1510 1515 152

Asp Ala Leu Ala Thr His Arg His Thr Gln Gly Gln Pro Ala Thr Thr
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Ile Ala Trp Gly Met Trp His Thr Thr Thr Thr Leu Thr Ser Gln Leu
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Ser Asp Asp Glu Gly Met
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<220>

<223> Description of Artificial Sequence: DNA encoding synthetic
 PKS synthase fragment

<220>

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1					5					10					15		

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Val	Ala	Ala	Ala	Leu	Asp	Asp	Ala	Pro	Asp	Val	Pro	Leu	Leu	Arg	Gly	
				20					25					30		

ctg	cg	cgt	acg	acc	gtc	cg	cgt	gcc	gcc	gtc	cg	gaa	gc	tct	ctc	143
Leu	Arg	Arg		Thr	Val	Arg	Arg	Ala	Ala	Val	Arg	Glu	Arg	Ser	Leu	
			35					40						45		

gcc	gac	gc	tgc	ccg	tgc	tgc	ccg	acg	acg	agc	gc	ccg	acg	cct	ccc	191
Ala	Asp	Arg	Ser	Pro	Cys	Cys	Pro	Thr	Thr	Ser	Ala	Pro	Thr	Pro	Pro	
			50				55					60				

tgc	cgt	tgc	tcc	tgg	aac	agc	acc	gcc	acc	gtg	ctc	ggc	cac	ctg	ggc	239
Ser	Arg	Ser	Ser	Trp	Asn	Ser	Ser	Thr	Ala	Thr	Val	Leu	Gly	His	Leu	Gly
	65				70						75					

gcc	gaa	gac	atc	ccg	gc	acg	acg	acg	ttc	aag	gaa	ctc	ggc	atc	gac	287
Ala	Glu	Asp	Ile	Pro	Ala	Thr	Thr	Thr	Phe	Lys	Glu	Leu	Gly	Ile	Asp	
	80				85				90					95		

tgc	ctc	acc	gc	gtc	cag	ctg	gc	aac	gc	ctg	acc	acg	gc	acc	ggc	335
Ser	Leu	Thr	Ala	Val	Gln	Leu	Arg	Asn	Ala	Leu	Thr	Thr	Ala	Thr	Gly	
			100						105					110		

gta	gc	ctc	aac	gcc	aca	gc	gtc	ttc	gac	ttt	ccg	acg	ccg	gc	gc	383
Val	Arg	Leu	Asn	Ala	Thr	Ala	Val	Phe	Asp	Phe	Pro	Thr	Pro	Arg	Ala	
			115				120						125			

ctc	gcc	gc	aga	ctc	ggc	gac	gag	ctg	gcc	ggt	acc	gc	gc	ccc	gtc	431
Leu	Ala	Ala	Arg	Leu	Gly	Asp	Glu	Leu	Ala	Gly	Thr	Arg	Ala	Pro	Val	
			130				135					140				

gc	gcc	cg	acc	gc	gcc	acc	gc	gcc	gc	cac	gac	gaa	ccg	ctg	gc	479
Ala	Ala	Arg	Thr	Ala	Ala	Thr	Ala	Ala	Ala	His	Asp	Glu	Pro	Leu	Ala	
	145				150					155						

atc	gtg	ggc	atg	gcc	tgc	cgt	ctg	ccg	ggc	ggg	gtc	gc	tgc	cca	cag	527
Ile	Val	Gly	Met	Ala	Cys	Arg	Leu	Pro	Gly	Gly	Val	Ala	Ser	Pro	Gln	
	160				165				170					175		

gag	ctg	tgg	cgt	ctc	gtc	gc	tcc	ggc	acc	gac	gcc	atc	acg	gag	ttc	575
Glu	Leu	Trp	Arg	Leu	Val	Ala	Ser	Gly	Thr	Asp	Ala	Ile	Thr	Glu	Phe	
			180						185					190		

ccc	gc	gac	gc	ggc	tgg	gac	gtg	gac	gc	ctc	tac	gac	ccg	gac	ccc	623
Pro	Ala	Asp	Arg	Gly	Trp	Asp	Val	Asp	Ala	Leu	Tyr	Asp	Pro	Asp	Pro	
			195				200						205			

gac	gc	atc	ggc	aag	acc	ttc	gtc	cg	cac	ggc	ggc	ttc	ctc	gac	ggt	671
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Ala	Thr	Gly	Phe	Asp	Ala	Ala	Phe	Phe	Gly	Ile	Ser	Pro	Arg	Glu	Ala	
	225					230					235					
ctg	gcc	atg	gac	ccg	cag	caa	cgg	gtg	ctc	ctg	gag	acg	tcc	tgg	gag	767
Leu	Ala	Met	Asp	Pro	Gln	Gln	Arg	Val	Leu	Leu	Glu	Thr	Ser	Trp	Glu	
	240				245				250					255		
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Ala	Phe	Glu	Ser	Ala	Gly	Ile	Thr	Pro	Asp	Ala	Ala	Arg	Gly	Ser	Asp	
			260						265					270		
acc	ggc	gtg	ttc	atc	ggc	gcg	ttc	tcc	tac	ggg	tac	ggc	acg	ggg	gcg	863
Thr	Gly	Val	Phe	Ile	Gly	Ala	Phe	Ser	Tyr	Gly	Tyr	Gly	Thr	Gly	Ala	
			275					280					285			
gat	acc	aac	ggc	ttc	ggc	gcg	aca	ggg	tcg	cag	acc	agc	gtg	ctc	tcc	911
Asp	Thr	Asn	Gly	Phe	Gly	Ala	Thr	Gly	Ser	Gln	Thr	Ser	Val	Leu	Ser	
		290				295						300				
ggc	cgc	ctc	tcg	tac	ttc	tac	ggg	ctg	gag	ggc	cct	tcg	gtc	acg	gtc	959
Gly	Arg	Leu	Ser	Tyr	Phe	Tyr	Gly	Leu	Glu	Gly	Pro	Ser	Val	Thr	Val	
	305				310						315					
gac	acc	gcc	tgc	tcg	tcg	tca	ctg	gtc	gcc	ctg	cac	cag	gca	ggg	cag	1007
Asp	Thr	Ala	Cys	Ser	Ser	Ser	Leu	Val	Ala	Leu	His	Gln	Ala	Gly	Gln	
	320				325				330					335		
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Ser	Leu	Arg	Ser	Gly	Glu	Cys	Ser	Leu	Ala	Leu	Val	Gly	Gly	Val	Thr	
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gtg	atg	gcg	tcg	ccc	ggc	gga	ttc	gtc	gag	ttc	tcc	cgg	cag	cgc	ggg	1103
Val	Met	Ala	Ser	Pro	Gly	Gly	Phe	Val	Glu	Phe	Ser	Arg	Gln	Arg	Gly	
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ctc	gcg	ccg	gac	ggg	cgg	gcg	aag	gcg	ttc	ggc	gcg	ggc	gcg	gac	ggg	1151
Leu	Ala	Pro	Asp	Gly	Arg	Ala	Lys	Ala	Phe	Gly	Ala	Gly	Ala	Asp	Gly	
		370				375						380				
acg	agc	ttc	gcc	gag	ggc	gcc	ggg	gcc	ctg	gtg	gtc	gag	cgg	ctc	tcc	1199
Thr	Ser	Phe	Ala	Glu	Gly	Ala	Gly	Ala	Leu	Val	Val	Glu	Arg	Leu	Ser	
	385				390					395						
gac	gcg	gag	cgc	cac	ggc	cac	acc	gtc	ctc	gcc	ctc	gta	cgc	ggc	tcc	1247
Asp	Ala	Glu	Arg	His	Gly	His	Thr	Val	Leu	Ala	Leu	Val	Arg	Gly	Ser	
	400				405				410					415		
gcg	gct	aac	tcc	gac	ggc	gcg	tcg	aac	ggg	ctg	tcg	gcg	ccg	aac	ggc	1295
Ala	Ala	Asn	Ser	Asp	Gly	Ala	Ser	Asn	Gly	Leu	Ser	Ala	Pro	Asn	Gly	
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Ala Gly Met Gly Glu Glu Leu Ala Ala Phe Pro Val Phe Ala Arg	
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Ile His Gln Gln Val Trp Asp Leu Leu Asp Val Pro Asp Leu Glu Val	
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Asn Glu Thr Gly Tyr Ala Gln Pro Ala Leu Phe Ala Met Gln Val Ala	
705 710 715	
ctg ttc ggg ctg ctg gaa tcg tgg ggt gta cga ccg gac gcg gtg atc	2207
Leu Phe Gly Leu Leu Glu Ser Trp Gly Val Arg Pro Asp Ala Val Ile	
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Gly His Ser Val Gly Glu Leu Ala Ala Ala Tyr Val Ser Gly Val Trp	
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Ser Leu Glu Asp Ala Cys Thr Leu Val Ser Ala Arg Ala Arg Leu Met	
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Gln Ala Leu Pro Ala Gly Gly Val Met Val Ala Val Pro Val Ser Glu	
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gat gag gcc cgg gcc gtg ctg ggt gag ggt gtg gag atc gcc gcg gtc	2399
Asp Glu Ala Arg Ala Val Leu Gly Glu Gly Val Glu Ile Ala Ala Val	
785 790 795	
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Asn Gly Pro Ser Ser Val Val Leu Ser Gly Asp Glu Ala Ala Val Leu	
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Gln Ala Ala Glu Gly Leu Gly Lys Trp Thr Arg Leu Ala Thr Ser His	
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Ala Phe His Ser Ala Arg Met Glu Pro Met Leu Glu Glu Phe Arg Ala	
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gtc gcc gaa ggc ctg acc tac ccg acg ccg cag gtc tcc atg gcc gtt	2591
Val Ala Glu Gly Leu Thr Tyr Arg Thr Pro Gln Val Ser Met Ala Val	
850 855 860	
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Gly Asp Gln Val Thr Thr Ala Glu Tyr Trp Val Arg Gln Val Arg Asp	
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gcc cac ctg tat gtc aac ggc gtc acg gtc gac tgg ccc cgc ctc ctg Ala His Leu Tyr Val Asn Gly Val Thr Val Asp Trp Pro Ala Leu Leu 930 935 940	2831
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tgc ggc cac ccc gtc ctc ggc acc gga gtc gcc gtc gcc ggg tgc ccg Ser Gly His Pro Val Leu Gly Thr Gly Val Ala Val Ala Gly Ser Pro 980 985 990	2975
ggc cgg gtg ttc acg ggt ccc gtg ccc gcc ggt ggc gac cgc cgc gtg Gly Arg Val Phe Thr Gly Pro Val Pro Ala Gly Ala Asp Arg Ala Val 995 1000 1005	3023
ttc atc gcc gaa ctg cgc ctc gcc gcc gcc gac gcc acc gac tgc gcc Phe Ile Ala Glu Leu Ala Leu Ala Ala Asp Ala Thr Asp Cys Ala 1010 1015 1020	3071
acg gtc gaa cag ctc gac gtc acc tcc gtg ccc ggc gga tcc gcc cgc Thr Val Glu Gln Leu Asp Val Thr Ser Val Pro Gly Gly Ser Ala Arg 1025 1030 1035	3119
ggc agg gcc acc cgc cag acc tgg gtc gat gaa ccc gcc gcc gac ggg Gly Arg Ala Thr Ala Gln Thr Trp Val Asp Glu Pro Ala Ala Asp Gly 1040 1045 1050 1055	3167
cgg cgc cgc ttc acc gtc cac acc cgc gtc ggc gac gcc ccg tgg acg Arg Arg Arg Phe Thr Val His Thr Arg Val Gly Asp Ala Pro Trp Thr 1060 1065 1070	3215
ctg cac gcc gag ggg gtt ctc cgc ccc gcc cgc gtg ccc cag ccc gaa Leu His Ala Glu Gly Val Leu Arg Pro Gly Arg Val Pro Gln Pro Glu 1075 1080 1085	3263
gcc gtc gac acc gcc tgg ccc ccg ccg ggc cgc gtg ccc cgc gac ggg Ala Val Asp Thr Ala Trp Pro Pro Pro Gly Ala Val Pro Ala Asp Gly 1090 1095 1100	3311

ctg ccc ggg gcg tgg cga cgc gcg gac cag gtc ttc gtc gaa gcc gaa 3359
 Leu Pro Gly Ala Trp Arg Arg Ala Asp Gln Val Phe Val Glu Ala Glu
 1105 1110 1115

gtc gac agc cct gac ggc ttc gtg gca cac ccc gac ctg ctc gac gcg 3407
 Val Asp Ser Pro Asp Gly Phe Val Ala His Pro Asp Leu Leu Asp Ala
 1120 1125 1130 1135

gtc ttc tcc gcg gtc ggc gac ggg agc cgc cag ccg acc gga tgg cgc 3455
 Val Phe Ser Ala Val Gly Asp Gly Ser Arg Gln Pro Thr Gly Trp Arg
 1140 1145 1150

gac ctc gcg gtg cac gcg tcg gac gcc acc gtg ctg cgc gcc tgc ctc 3503
 Asp Leu Ala Val His Ala Ser Asp Ala Thr Val Leu Arg Ala Cys Leu
 1155 1160 1165

acc cgc cgc gac agt ggt gtc gtg gag ctc gcc gcc ttc gac ggt gcc 3551
 Thr Arg Arg Asp Ser Gly Val Val Glu Leu Ala Ala Phe Asp Gly Ala
 1170 1175 1180

gga atg ccg gtg ctc acc gcg gag tcg gtg acg ctg ggc gag gtc gcg 3599
 Gly Met Pro Val Leu Thr Ala Glu Ser Val Thr Leu Gly Glu Val Ala
 1185 1190 1195

tcg gca ggc gga tcc gac gag tcg gac ggt ctg ctt cgg ctt gag tgg 3647
 Ser Ala Gly Gly Ser Asp Glu Ser Asp Gly Leu Leu Arg Leu Glu Trp
 1200 1205 1210 1215

ttg ccg gtg gcg gag gcc cac tac gac ggt gcc gac gag ctg ccc gag 3695
 Leu Pro Val Ala Glu Ala His Tyr Asp Gly Ala Asp Glu Leu Pro Glu
 1220 1225 1230

ggc tac acc ctc atc acc gcc aca cac ccc gac gac ccc gac gac ccc 3743
 Gly Tyr Thr Leu Ile Thr Ala Thr His Pro Asp Asp Pro Asp Asp Pro
 1235 1240 1245

acc aac ccc cac aac aca ccc aca cgc acc cac aca caa acc aca cgc 3791
 Thr Asn Pro His Asn Thr Pro Thr Arg Thr His Thr Gln Thr Thr Arg
 1250 1255 1260

gtc ctc acc gcc ctc caa cac cac ctc atc acc acc aac cac acc ctc 3839
 Val Leu Thr Ala Leu Gln His His Leu Ile Thr Thr Asn His Thr Leu
 1265 1270 1275

atc gtc cac acc acc acc gac ccc cca ggc gcc gcc gtc acc ggc ctc 3887
 Ile Val His Thr Thr Thr Asp Pro Pro Gly Ala Ala Val Thr Gly Leu
 1280 1285 1290 1295

acc cgc acc gca caa aac gaa cac ccc ggc cgc atc cac ctc atc gaa 3935
 Thr Arg Thr Ala Gln Asn Glu His Pro Gly Arg Ile His Leu Ile Glu
 1300 1305 1310

acc cac cac ccc cac acc cca ctc ccc ctc acc caa ctc acc acc ctc 3983
 Thr His His Pro His Thr Pro Leu Pro Leu Thr Gln Leu Thr Thr Leu
 1315 1320 1325

00340315:0002701

tcg gac gac gag ggc atg c
 Ser Asp Asp Glu Gly Met
 1555

4674

<210> 27
 <211> 1557
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic PKS
 synthase fragment

<400> 27
 Met Arg Leu Tyr Glu Ala Ala Arg Arg Thr Gly Ser Pro Val Val Val
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 Ala Ala Ala Leu Asp Asp Ala Pro Asp Val Pro Leu Leu Arg Gly Leu
 20 25 30
 Arg Arg Thr Thr Val Arg Arg Ala Ala Val Arg Glu Arg Ser Leu Ala
 35 40 45
 Asp Arg Ser Pro Cys Cys Pro Thr Thr Ser Ala Pro Thr Pro Pro Ser
 50 55 60
 Arg Ser Ser Trp Asn Ser Thr Ala Thr Val Leu Gly His Leu Gly Ala
 65 70 75 80
 Glu Asp Ile Pro Ala Thr Thr Phe Lys Glu Leu Gly Ile Asp Ser
 85 90 95
 Leu Thr Ala Val Gln Leu Arg Asn Ala Leu Thr Thr Ala Thr Gly Val
 100 105 110
 Arg Leu Asn Ala Thr Ala Val Phe Asp Phe Pro Thr Pro Arg Ala Leu
 115 120 125
 Ala Ala Arg Leu Gly Asp Glu Leu Ala Gly Thr Arg Ala Pro Val Ala
 130 135 140
 Ala Arg Thr Ala Ala Thr Ala Ala Ala His Asp Glu Pro Leu Ala Ile
 145 150 155 160
 Val Gly Met Ala Cys Arg Leu Pro Gly Gly Val Ala Ser Pro Gln Glu
 165 170 175
 Leu Trp Arg Leu Val Ala Ser Gly Thr Asp Ala Ile Thr Glu Phe Pro
 180 185 190
 Ala Asp Arg Gly Trp Asp Val Asp Ala Leu Tyr Asp Pro Asp Pro Asp
 195 200 205
 Ala Ile Gly Lys Thr Phe Val Arg His Gly Gly Phe Leu Asp Gly Ala
 210 215 220

Thr Gly Phe Asp Ala Ala Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu
 225 230 235 240
 Ala Met Asp Pro Gln Gln Arg Val Leu Leu Glu Thr Ser Trp Glu Ala
 245 250 255
 Phe Glu Ser Ala Gly Ile Thr Pro Asp Ala Ala Arg Gly Ser Asp Thr
 260 265 270
 Gly Val Phe Ile Gly Ala Phe Ser Tyr Gly Tyr Gly Thr Gly Ala Asp
 275 280 285
 Thr Asn Gly Phe Gly Ala Thr Gly Ser Gln Thr Ser Val Leu Ser Gly
 290 295 300
 Arg Leu Ser Tyr Phe Tyr Gly Leu Glu Gly Pro Ser Val Thr Val Asp
 305 310 315 320
 Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Gln Ala Gly Gln Ser
 325 330 335
 Leu Arg Ser Gly Glu Cys Ser Leu Ala Leu Val Gly Gly Val Thr Val
 340 345 350
 Met Ala Ser Pro Gly Gly Phe Val Glu Phe Ser Arg Gln Arg Gly Leu
 355 360 365
 Ala Pro Asp Gly Arg Ala Lys Ala Phe Gly Ala Gly Ala Asp Gly Thr
 370 375 380
 Ser Phe Ala Glu Gly Ala Gly Ala Leu Val Val Glu Arg Leu Ser Asp
 385 390 395 400
 Ala Glu Arg His Gly His Thr Val Leu Ala Leu Val Arg Gly Ser Ala
 405 410 415
 Ala Asn Ser Asp Gly Ala Ser Asn Gly Leu Ser Ala Pro Asn Gly Pro
 420 425 430
 Ser Gln Glu Arg Val Ile His Gln Ala Leu Ala Asn Ala Lys Leu Thr
 435 440 445
 Pro Ala Asp Val Asp Ala Val Glu Ala His Gly Thr Gly Thr Arg Leu
 450 455 460
 Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Gln Asp
 465 470 475 480
 Arg Ala Thr Pro Leu Leu Leu Gly Ser Leu Lys Ser Asn Ile Gly His
 485 490 495
 Ala Gln Ala Ala Ser Gly Val Ala Gly Ile Ile Lys Met Val Gln Ala
 500 505 510
 Ile Arg His Gly Glu Leu Pro Pro Thr Leu His Ala Asp Glu Pro Ser
 515 520 525

Pro His Val Asp Trp Thr Ala Gly Ala Val Glu Leu Leu Thr Ser Ala
 530 535 540
 Arg Pro Trp Pro Gly Thr Gly Arg Pro Arg Ala Gly Val Ser Ser
 545 550 555 560
 Phe Gly Ile Ser Gly Thr Asn Ala His Val Ile Leu Glu Ser Ala Pro
 565 570 575
 Pro Thr Gln Pro Ala Asp Asn Ala Val Ile Glu Arg Ala Pro Glu Trp
 580 585 590
 Val Pro Leu Val Ile Ser Ala Arg Thr Gln Ser Ala Leu Thr Glu His
 595 600 605
 Glu Gly Arg Leu Arg Ala Tyr Leu Ala Ala Ser Pro Gly Val Asp Met
 610 615 620
 Arg Ala Val Ala Ser Thr Leu Ala Met Thr Arg Ser Val Phe Glu His
 625 630 635 640
 Arg Ala Val Leu Leu Gly Asp Asp Thr Val Thr Gly Thr Ala Val Ser
 645 650 655
 Asp Pro Arg Ala Val Phe Val Phe Pro Gly Gln Gly Ser Gln Arg Ala
 660 665 670
 Gly Met Gly Glu Glu Leu Ala Ala Ala Phe Pro Val Phe Ala Arg Ile
 675 680 685
 His Gln Gln Val Trp Asp Leu Leu Asp Val Pro Asp Leu Glu Val Asn
 690 695 700
 Glu Thr Gly Tyr Ala Gln Pro Ala Leu Phe Ala Met Gln Val Ala Leu
 705 710 715 720
 Phe Gly Leu Leu Glu Ser Trp Gly Val Arg Pro Asp Ala Val Ile Gly
 725 730 735
 His Ser Val Gly Glu Leu Ala Ala Ala Tyr Val Ser Gly Val Trp Ser
 740 745 750
 Leu Glu Asp Ala Cys Thr Leu Val Ser Ala Arg Ala Arg Leu Met Gln
 755 760 765
 Ala Leu Pro Ala Gly Gly Val Met Val Ala Val Pro Val Ser Glu Asp
 770 775 780
 Glu Ala Arg Ala Val Leu Gly Glu Gly Val Glu Ile Ala Ala Val Asn
 785 790 795 800
 Gly Pro Ser Ser Val Val Leu Ser Gly Asp Glu Ala Ala Val Leu Gln
 805 810 815
 Ala Ala Glu Gly Leu Gly Lys Trp Thr Arg Leu Ala Thr Ser His Ala
 820 825 830

Phe His Ser Ala Arg Met Glu Pro Met Leu Glu Glu Phe Arg Ala Val
 835 840 845
 Ala Glu Gly Leu Thr Tyr Arg Thr Pro Gln Val Ser Met Ala Val Gly
 850 855 860
 Asp Gln Val Thr Thr Ala Glu Tyr Trp Val Arg Gln Val Arg Asp Thr
 865 870 875 880
 Val Arg Phe Gly Glu Gln Val Ala Ser Tyr Glu Asp Ala Val Phe Val
 885 890 895
 Glu Leu Gly Ala Asp Arg Ser Leu Ala Arg Leu Val Asp Gly Val Ala
 900 905 910
 Met Leu His Gly Asp His Glu Ile Gln Ala Ala Ile Gly Ala Leu Ala
 915 920 925
 His Leu Tyr Val Asn Gly Val Thr Val Asp Trp Pro Ala Leu Leu Gly
 930 935 940
 Asp Ala Pro Ala Thr Arg Val Leu Asp Leu Pro Thr Tyr Ala Phe Gln
 945 950 955 960
 His Gln Arg Tyr Trp Leu Glu Ser Ala Pro Pro Ala Thr Ala Asp Ser
 965 970 975
 Gly His Pro Val Leu Gly Thr Gly Val Ala Val Ala Gly Ser Pro Gly
 980 985 990
 Arg Val Phe Thr Gly Pro Val Pro Ala Gly Ala Asp Arg Ala Val Phe
 995 1000 1005
 Ile Ala Glu Leu Ala Leu Ala Ala Asp Ala Thr Asp Cys Ala Thr
 1010 1015 1020
 Val Glu Gln Leu Asp Val Thr Ser Val Pro Gly Gly Ser Ala Arg Gly
 1025 1030 1035 1040
 Arg Ala Thr Ala Gln Thr Trp Val Asp Glu Pro Ala Ala Asp Gly Arg
 1045 1050 1055
 Arg Arg Phe Thr Val His Thr Arg Val Gly Asp Ala Pro Trp Thr Leu
 1060 1065 1070
 His Ala Glu Gly Val Leu Arg Pro Gly Arg Val Pro Gln Pro Glu Ala
 1075 1080 1085
 Val Asp Thr Ala Trp Pro Pro Pro Gly Ala Val Pro Ala Asp Gly Leu
 1090 1095 1100
 Pro Gly Ala Trp Arg Arg Ala Asp Gln Val Phe Val Glu Ala Glu Val
 1105 1110 1115 1120
 Asp Ser Pro Asp Gly Phe Val Ala His Pro Asp Leu Leu Asp Ala Val
 1125 1130 1135

1045 1035 1025 1015 1005 995 985 975 965 955 945 935 925 915 905 895 885 875 865 855 845 835

Phe Ser Ala Val Gly Asp Gly Ser Arg Gln Pro Thr Gly Trp Arg Asp
 1140 1145 1150
 Leu Ala Val His Ala Ser Asp Ala Thr Val Leu Arg Ala Cys Leu Thr
 1155 1160 1165
 Arg Arg Asp Ser Gly Val Val Glu Leu Ala Ala Phe Asp Gly Ala Gly
 1170 1175 1180
 Met Pro Val Leu Thr Ala Glu Ser Val Thr Leu Gly Glu Val Ala Ser
 185 1190 1195 120
 Ala Gly Gly Ser Asp Glu Ser Asp Gly Leu Leu Arg Leu Glu Trp Leu
 1205 1210 1215
 Pro Val Ala Glu Ala His Tyr Asp Gly Ala Asp Glu Leu Pro Glu Gly
 1220 1225 1230
 Tyr Thr Leu Ile Thr Ala Thr His Pro Asp Asp Pro Asp Asp Pro Thr
 1235 1240 1245
 Asn Pro His Asn Thr Pro Thr Arg Thr His Thr Gln Thr Thr Arg Val
 1250 1255 1260
 Leu Thr Ala Leu Gln His His Leu Ile Thr Thr Asn His Thr Leu Ile
 265 1270 1275 128
 Val His Thr Thr Thr Asp Pro Pro Gly Ala Ala Val Thr Gly Leu Thr
 1285 1290 1295
 Arg Thr Ala Gln Asn Glu His Pro Gly Arg Ile His Leu Ile Glu Thr
 1300 1305 1310
 His His Pro His Thr Pro Leu Pro Leu Thr Gln Leu Thr Thr Leu His
 1315 1320 1325
 Gln Pro His Leu Arg Leu Thr Asn Asn Thr Leu His Thr Pro His Leu
 1330 1335 1340
 Thr Pro Ile Thr Thr His His Asn Thr Thr Thr Thr Pro Asn Thr
 345 1350 1355 136
 Pro Pro Leu Asn Pro Asn His Ala Ile Leu Ile Thr Gly Gly Ser Gly
 1365 1370 1375
 Thr Leu Ala Gly Ile Leu Ala Arg His Leu Asn His Pro His Thr Tyr
 1380 1385 1390
 Leu Leu Ser Arg Thr Pro Pro Pro Thr Thr Pro Gly Thr His Ile
 1395 1400 1405
 Pro Cys Asp Leu Thr Asp Pro Thr Gln Ile Thr Gln Ala Leu Thr His
 1410 1415 1420
 Ile Pro Gln Pro Leu Thr Gly Ile Phe His Thr Ala Ala Thr Leu Asp
 425 1430 1435 144

00040316-002701

Asp Ala Thr Leu Thr Asn Leu Thr Pro Gln His Leu Thr Thr Thr Leu
1445 1450 1455

Gln Pro Lys Ala Asp Ala Ala Trp His Leu His His His Thr Gln Asn
1460 1465 1470

Gln Pro Leu Thr His Phe Val Leu Tyr Ser Ser Ala Ala Ala Thr Leu
1475 1480 1485

Gly Ser Pro Gly Gln Ala Asn Tyr Ala Ala Ala Asn Ala Phe Leu Asp
1490 1495 1500

Ala Leu Ala Thr His Arg His Thr Gln Gly Gln Pro Ala Thr Thr Ile
505 1510 1515 152

Ala Trp Gly Met Trp His Thr Thr Thr Leu Thr Ser Gln Leu Thr
1525 1530 1535

Asp Ser Asp Arg Asp Arg Ile Arg Arg Gly Gly Phe Leu Pro Ile Ser
1540 1545 1550

Asp Asp Glu Gly Met
1555

<210> 28

<211> 4767

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: DNA encoding synthetic
PKS synthase fragment

<220>

<221> CDS

<222> (3)..(4766)

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gtg gcg gcc gcg ctc gac gac gcg ccg gac gtg ccg ctg ctg cgc ggg 95
Val Ala Ala Ala Leu Asp Asp Ala Pro Asp Val Pro Leu Leu Arg Gly
20 25 30

ctg cgg cgt acg acc gtc cgg cgt gcc gcc gtc cgg gaa cgc tct ctc 143
Leu Arg Arg Thr Thr Val Arg Arg Ala Ala Val Arg Glu Arg Ser Leu
35 40 45

gcc gac cgc tcg ccg tgc tgc ccg acg acg agc gcg ccg acg cct ccc 191
Ala Asp Arg Ser Pro Cys Cys Pro Thr Thr Ser Ala Pro Thr Pro Pro
50 55 60

tcg cgt tcg tcc tgg aac agc acc gcc acc gtg ctc ggc cac ctg ggc 239
Ser Arg Ser Ser Trp Asn Ser Thr Ala Thr Val Leu Gly His Leu Gly
65 70 75

gcc Ala 80	gaa Glu	gac Asp	atc Ile	atc Pro	gcg Ala 85	gcg Thr	acg Thr	acg Thr	acg Thr	ttc Phe	aag Lys 90	gaa Glu	ctc Leu	ggc Gly	atc Ile	gac Asp 95	287
tgc Ser	ctc Leu	acc Thr	gcg Ala	gtc Val 100	cag Gln	ctg Leu	cgc Arg	aac Asn	gcg Ala 105	ctg Leu	acc Thr	acg Thr	gcg Ala	acc Thr	ggc Gly	335	
gta Val	cgc Arg	ctc Leu	aac Asn 115	gcc Ala	aca Thr	gcg Ala	gtc Val	ttc Phe	gac Asp 120	ttt Phe	cgc Pro	acg Thr	cgc Pro	cgc Arg	cgc Ala	383	
ctc Leu	gcc Ala	gcg Ala	aga Arg 130	ctc Leu	ggc Gly	gac Asp	gag Glu 135	ctg Leu	gcc Ala	ggt Gly	acc Thr	cgc Arg 140	gcg Ala	ccc Pro	gtc Val	431	
gcg Ala 145	gcc Ala	cgg Arg	acc Thr	gcg Ala	gcc Ala	acc Thr 150	gcg Ala	gcc Ala	gcg Ala	cac His 155	gac Asp 155	gaa Glu	cgc Pro	ctg Leu	gcg Ala	479	
atc Ile 160	gtg Val	ggc Gly	atg Met	gcc Ala	tgc Cys 165	cgt Arg	ctg Leu	cgc Pro	ggc Gly	ggg Gly 170	gtc Val	gcg Ala	tgc Ser	cca Pro	cag Gln 175	527	
gag Glu	ctg Leu	tgg Trp	cgt Arg 180	ctc Leu	gtc Val	gcg Ala	tcc Ser	ggc Gly	acc Thr 185	gac Asp	gcc Ala	atc Ile	acg Thr	gag Glu 190	ttc Phe	575	
ccc Pro	gcg Ala	gac Asp	cgc Arg 195	ggc Gly	tgg Trp	gac Asp	gtg Val	gac Val 200	gcg Gly	ctc Ala	tac Tyr	gac Asp 205	cgc Pro	gac Asp	ccc Pro	623	
gac Asp	gcg Ala	atc Ile 210	ggc Gly	aag Lys	acc Thr	ttc Phe	gtc Val 215	cgg Arg	cac His	ggc Gly	ggc Gly	ttc Phe 220	ctc Leu	gac Asp	ggt Gly	671	
gcg Ala 225	acc Thr	ggc Gly	ttc Phe	gac Asp	gcg Ala	gcg Ala 230	ttc Phe	ttc Phe	ggg Gly	atc Ile	agc Ser 235	cgc Pro	cgc Arg	gag Glu	gcc Ala	719	
ctg Leu 240	gcc Ala	atg Met	gac Asp	cgc Pro	cag Gln	caa Gln	cgg Arg	gtg Val	ctc Leu 250	ctg Leu	gag Glu	acg Thr	tcc Ser	tgg Trp	gag Glu 255	767	
gcg Ala	ttc Phe	gaa Glu	agc Ser	Ala 260	ggc Gly	atc Ile	acc Thr	cgc Pro	gac Asp 265	gcg Ala	gcg Ala	cgc Arg	ggc Gly	agc Ser 270	gac Asp	815	
acc Thr	ggc Gly	gtg Val	ttc Phe 275	atc Ile	ggc Gly	gcg Ala	ttc Phe	tcc Ser 280	tac Tyr	ggg Gly	tac Tyr	ggc Gly	acg Thr	ggt Gly	gcg Ala	863	
gat Asp	acc Thr	aac Asn 290	ggc Gly	ttc Phe	ggc Gly	gcg Ala	aca Thr 295	ggg Gly	tcg Ser	cag Gln	acc Thr	agc Ser 300	gtg Val	ctc Leu	tcc Ser	911	

ggc cgc ctc tgc tac ttc tac ggt ctg gag ggc cct tgc gtc acg gtc	959
Gly Arg Leu Ser Tyr Phe Tyr Gly Leu Glu Gly Pro Ser Val Thr Val	
305 310 315	
gac acc gcc tgc tgc tgc tca ctg gtc gcc ctg cac cag gca ggg cag	1007
Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Gln Ala Gly Gln	
320 325 330 335	
tcc ctg cgc tgc ggc gaa tgc tgc ctc gcc ctg gtc ggc ggt gtc acg	1055
Ser Leu Arg Ser Gly Glu Cys Ser Leu Ala Leu Val Gly Gly Val Thr	
340 345 350	
gtg atg ggc tgc ccc ggc gga ttc gtc gag ttc tcc cgg cag cgc ggg	1103
Val Met Ala Ser Pro Gly Gly Phe Val Glu Phe Ser Arg Gln Arg Gly	
355 360 365	
ctc gcg ccg gac ggg cgg gcg aag gcg ttc ggc gcg ggc gcg gac ggt	1151
Leu Ala Pro Asp Gly Arg Ala Lys Ala Phe Gly Ala Gly Ala Asp Gly	
370 375 380	
acg agc ttc gcc gag ggc gcc ggt gcc ctg gtg gtc gag cgg ctc tcc	1199
Thr Ser Phe Ala Glu Gly Ala Gly Ala Leu Val Val Glu Arg Leu Ser	
385 390 395	
gac gcg gag cgc cac ggc cac acc gtc ctc gcc ctc gta cgc ggc tcc	1247
Asp Ala Glu Arg His Gly His Thr Val Leu Ala Leu Val Arg Gly Ser	
400 405 410 415	
gcg gct aac tcc gac ggc gcg tgc aac ggt ctg tgc gcg ccg aac ggc	1295
Ala Ala Asn Ser Asp Gly Ala Ser Asn Gly Leu Ser Ala Pro Asn Gly	
420 425 430	
ccc tcc cag gaa cgc gtc atc cac cag gcc ctc gcg aac gcg aaa ctc	1343
Pro Ser Gln Glu Arg Val Ile His Gln Ala Leu Ala Asn Ala Lys Leu	
435 440 445	
acc ccc gcc gat gtc gac gcg gtc gag gcg cac ggc acc ggc acc cgc	1391
Thr Pro Ala Asp Val Asp Ala Val Glu Ala His Gly Thr Gly Thr Arg	
450 455 460	
ctc ggc gac ccc atc gag gcg cag gcg ctg ctc gcg acg tac gga cag	1439
Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Gln	
465 470 475	
gac cgg gcg acg ccc ctg ctg ctc ggc tgc ctg aag tgc aac atc ggg	1487
Asp Arg Ala Thr Pro Leu Leu Leu Gly Ser Leu Lys Ser Asn Ile Gly	
480 485 490 495	
cac gcc cag gcc gcg tca ggg gtc gcc ggg atc atc aag atg gtg cag	1535
His Ala Gln Ala Ala Ser Gly Val Ala Gly Ile Ile Lys Met Val Gln	
500 505 510	
gcc atc cgg cac ggg gaa ctg ccg ccg aca ctg cac gcg gac gag ccg	1583
Ala Ile Arg His Gly Glu Leu Pro Pro Thr Leu His Ala Asp Glu Pro	
515 520 525	

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tcg ccg cac gtc gac tgg acg gcc ggt gcc gtc gag ctc ctg acg tcg	1631
Ser Pro His Val Asp Trp Thr Ala Gly Ala Val Glu Leu Leu Thr Ser	
530 535 540	
gcc cgg ccg tgg ccg ggg acc ggt cgc cct agg cgg gcg ggc gtg tcg	1679
Ala Arg Pro Trp Pro Gly Thr Gly Arg Pro Arg Arg Ala Gly Val Ser	
545 550 555	
tcc ttc gga gtc agc gcc acc aac gcc cac gtc atc ctg gag agc gca	1727
Ser Phe Gly Val Ser Gly Thr Asn Ala His Val Ile Leu Glu Ser Ala	
560 565 570 575	
ccc ccc gct cag ccc gcg gag gag gcg cag cct gtt gag acg ccg gtg	1775
Pro Pro Ala Gln Pro Ala Glu Glu Ala Gln Pro Val Glu Thr Pro Val	
580 585 590	
gtg gcc tcg gat gtg ctg ccg ctg gtg ata tcg gcc aag acc cag ccc	1823
Val Ala Ser Asp Val Leu Pro Leu Val Ile Ser Ala Lys Thr Gln Pro	
595 600 605	
gcc ctg acc gaa cac gaa gac cgg ctg cgc gcc tac ctg gcg gcg tcg	1871
Ala Leu Thr Glu His Glu Asp Arg Leu Arg Ala Tyr Leu Ala Ala Ser	
610 615 620	
ccc ggg gcg gat ata cgg gct gtg gca tcg acg ctg gcg gtg aca cgg	1919
Pro Gly Ala Asp Ile Arg Ala Val Ala Ser Thr Leu Ala Val Thr Arg	
625 630 635	
tcg gtg ttc gag cac cgc gcc gta ctc ctt gga gat gac acc gtc acc	1967
Ser Val Phe Glu His Arg Ala Val Leu Leu Gly Asp Thr Val Thr	
640 645 650 655	
ggc acc gcg gtg acc gac ccc agg atc gtg ttt gtc ttt ccc ggg cag	2015
Gly Thr Ala Val Thr Asp Pro Arg Ile Val Phe Val Phe Pro Gly Gln	
660 665 670	
ggg tgg cag tgg ctg ggg atg gcc agt gca ctg cgc gat tcg tcg gtg	2063
Gly Trp Gln Trp Leu Gly Met Gly Ser Ala Leu Arg Asp Ser Ser Val	
675 680 685	
gtg ttc gcc gag cgg atg gcc gag tgt gcg gcg gcg ttg cgc gag ttc	2111
Val Phe Ala Glu Arg Met Ala Glu Cys Ala Ala Ala Leu Arg Glu Phe	
690 695 700	
gtg gac tgg gat ctg ttc acg gtt ctg gat gat ccg gcg gtg gtg gac	2159
Val Asp Trp Asp Leu Phe Thr Val Leu Asp Asp Pro Ala Val Val Asp	
705 710 715	
cgg gtt gat gtg gtc cag ccc gct tcc tgg gcg atg atg gtt tcc ctg	2207
Arg Val Asp Val Val Gln Pro Ala Ser Trp Ala Met Met Val Ser Leu	
720 725 730 735	
gcc gcg gtg tgg cag gcg gcc ggt gtg cgg ccg gat gcg gtg atc ggc	2255
Ala Ala Val Trp Gln Ala Ala Gly Val Arg Pro Asp Ala Val Ile Gly	
740 745 750	

cat	tcg	cag	ggg	gag	atc	gcc	gca	gct	tgt	gtg	gcg	ggg	gcg	gtg	tca	2303
His	Ser	Gln	Gly	Glu	Ile	Ala	Ala	Ala	Cys	Val	Ala	Gly	Ala	Val	Ser	
			755					760								
cta	cgc	gat	gcc	gcc	cgg	atc	gtg	acc	ttg	cgc	agc	cag	gcg	atc	gcc	2351
Leu	Arg	Asp	Ala	Ala	Arg	Ile	Val	Thr	Leu	Arg	Ser	Gln	Ala	Ile	Ala	
			770				775					780				
cgg	ggc	ctg	gcg	ggc	cgg	ggc	gcg	atg	gca	tcc	gtc	gcc	ctg	ccc	gcg	2399
Arg	Gly	Leu	Ala	Gly	Arg	Gly	Ala	Met	Ala	Ser	Val	Ala	Leu	Pro	Ala	
			785			790					795					
cag	gat	gtc	gag	ctg	gtc	gac	ggg	gcc	tgg	atc	gcc	gcc	cac	aac	ggg	2447
Gln	Asp	Val	Glu	Leu	Val	Asp	Gly	Ala	Trp	Ile	Ala	Ala	His	Asn	Gly	
					805					810					815	
ccc	gcc	tcc	acc	gtg	atc	gcg	ggc	acc	cgg	gaa	gcg	gtc	gac	cat	gtc	2495
Pro	Ala	Ser	Thr		Ile	Ala	Gly	Thr	Pro	Glu	Ala	Val	Asp	His	Val	
				820					825					830		
ctc	acc	gct	cat	gag	gca	caa	ggg	gtg	cgg	gtg	cgg	cgg	atc	acc	gtc	2543
Leu	Thr	Ala	His	Glu	Ala	Gln	Gly	Val	Arg	Val	Arg	Arg	Ile	Thr	Val	
				835				840					845			
gac	tat	gcc	tcg	cac	acc	cgg	cac	gtc	gag	ctg	atc	cgc	gac	gaa	cta	2591
Asp	Tyr	Ala	Ser	His	Thr	Pro	His	Val	Glu	Leu	Ile	Arg	Asp	Glu	Leu	
				850			855					860				
ctc	gac	atc	act	agc	gac	agc	agc	tcg	cag	acc	cgg	ctc	gtg	ccg	tgg	2639
Leu	Asp	Ile	Thr	Ser	Asp	Ser	Ser	Ser	Gln	Thr	Pro	Leu	Val	Pro	Trp	
						870					875					
ctg	tcg	acc	gtg	gac	ggc	acc	tgg	gtc	gac	agc	cgg	ctg	gac	ggg	gag	2687
Leu	Ser	Thr	Val	Asp	Gly	Thr	Trp	Val	Asp	Ser	Pro	Leu	Asp	Gly	Glu	
					885					890					895	
tac	tgg	tac	cgg	aac	ctg	cgt	gaa	cgg	gtc	ggg	ttc	cac	ccc	gcc	gtc	2735
Tyr	Trp	Tyr	Arg	Asn	Leu	Arg	Glu	Pro	Val	Gly	Phe	His	Pro	Ala	Val	
				900				905						910		
agc	cag	ttg	cag	gcc	cag	ggc	gac	acc	gtg	ttc	gtc	gag	gtc	agc	gcc	2783
Ser	Gln	Leu	Gln	Ala	Gln	Gly	Asp	Thr	Val	Phe	Val	Glu	Val	Ser	Ala	
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agc	cgg	gtg	ttg	ttg	cag	gcg	atg	gac	gat	gtc	gtc	acg	gtt	gcc		2831
Ser	Pro	Val	Leu	Leu	Gln	Ala	Met	Asp	Asp	Val	Val	Thr	Val	Ala		
				930			935					940				
acg	ctg	cgt	cgt	gac	gac	ggc	gac	gcc	acc	cgg	atg	ctc	acc	gcc	ctg	2879
Thr	Leu	Arg	Arg	Asp	Asp	Gly	Asp	Ala	Thr	Arg	Met	Leu	Thr	Ala	Leu	
				945		950					955					
gca	cag	gcc	tat	gtc	cac	ggc	gtc	acc	gtc	gac	tgg	ccc	gcc	atc	ctc	2927
Ala	Gln	Ala	Tyr	Val	His	Gly	Val	Thr	Val	Asp	Trp	Pro	Ala	Ile	Leu	
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Gly Thr Thr Thr Arg Val Leu Asp Leu Pro Thr Tyr Ala Phe Gln	
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cac cag cgg tac tgg ctc gag tcg gct ccc ccg gcc acg gcc gac tcg	3023
His Gln Arg Tyr Trp Leu Glu Ser Ala Pro Pro Ala Thr Ala Asp Ser	
995 1000 1005	
ggc cac ccc gtc ctc ggc acc gga gtc gcc gtc gcc ggg tcg ccg ggc	3071
Gly His Pro Val Leu Gly Thr Gly Val Ala Val Ala Gly Ser Pro Gly	
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cgg gtg ttc acg ggt ccc gtg ccc gcc ggt gcg gac cgc gcg gtg ttc	3119
Arg Val Phe Thr Gly Pro Val Pro Ala Gly Ala Asp Arg Ala Val Phe	
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Ile Ala Glu Leu Ala Leu Ala Ala Ala Asp Ala Thr Asp Cys Ala Thr	
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gtc gaa cag ctc gac gtc acc tcc gtg ccc ggc gga tcc gcc cgc ggc	3215
Val Glu Gln Leu Asp Val Thr Ser Val Pro Gly Gly Ser Ala Arg Gly	
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agg gcc acc gcg cag acc tgg gtc gat gaa ccc gcc gcc gac ggg cgg	3263
Arg Ala Thr Ala Gln Thr Trp Val Asp Glu Pro Ala Ala Asp Gly Arg	
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Arg Arg Phe Thr Val His Thr Arg Val Gly Asp Ala Pro Trp Thr Leu	
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cac gcc gag ggg gtt ctc cgc ccc ggc cgc gtg ccc cag ccc gaa gcc	3359
His Ala Glu Gly Val Leu Arg Pro Gly Arg Val Pro Gln Pro Glu Ala	
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Val Asp Thr Ala Trp Pro Pro Gly Ala Val Pro Ala Asp Gly Leu	
1120 1125 1130 1135	
ccc ggg gcg tgg cga cgc gcg gac cag gtc ttc gtc gaa gcc gaa gtc	3455
Pro Gly Ala Trp Arg Arg Ala Asp Gln Val Phe Val Glu Ala Glu Val	
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Asp Ser Pro Asp Gly Phe Val Ala His Pro Asp Leu Leu Asp Ala Val	
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Arg	Arg	Thr	Thr	Val	Arg	Arg	Ala	Ala	Val	Arg	Glu	Arg	Ser	Leu	Ala
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Asp	Arg	Ser	Pro	Cys	Cys	Pro	Thr	Thr	Ser	Ala	Pro	Thr	Pro	Pro	Ser
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Arg	Ser	Ser	Trp	Asn	Ser	Thr	Ala	Thr	Val	Leu	Gly	His	Leu	Gly	Ala
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Glu	Asp	Ile	Pro	Ala	Thr	Thr	Thr	Phe	Lys	Glu	Leu	Gly	Ile	Asp	Ser
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Leu	Thr	Ala	Val	Gln	Leu	Arg	Asn	Ala	Leu	Thr	Thr	Ala	Thr	Gly	Val
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Arg	Leu	Asn	Ala	Thr	Ala	Val	Phe	Asp	Phe	Pro	Thr	Pro	Arg	Ala	Leu
	115						120					125			
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	145				150					155				160	
Val	Gly	Met	Ala	Cys	Arg	Leu	Pro	Gly	Gly	Val	Ala	Ser	Pro	Gln	Glu
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Leu	Trp	Arg	Leu	Val	Ala	Ser	Gly	Thr	Asp	Ala	Ile	Thr	Glu	Phe	Pro
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Ala	Asp	Arg	Gly	Trp	Asp	Val	Asp	Ala	Leu	Tyr	Asp	Pro	Asp	Pro	Asp
	195						200					205			
Ala	Ile	Gly	Lys	Thr	Phe	Val	Arg	His	Gly	Gly	Phe	Leu	Asp	Gly	Ala
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Thr	Gly	Phe	Asp	Ala	Ala	Phe	Phe	Gly	Ile	Ser	Pro	Arg	Glu	Ala	Leu
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Ala	Met	Asp	Pro	Gln	Gln	Arg	Val	Leu	Leu	Glu	Thr	Ser	Trp	Glu	Ala
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Phe	Glu	Ser	Ala	Gly	Ile	Thr	Pro	Asp	Ala	Ala	Arg	Gly	Ser	Asp	Thr
		260						265					270		
Gly	Val	Phe	Ile	Gly	Ala	Phe	Ser	Tyr	Gly	Tyr	Gly	Thr	Gly	Ala	Asp
	275					280						285			
Thr	Asn	Gly	Phe	Gly	Ala	Thr	Gly	Ser	Gln	Thr	Ser	Val	Leu	Ser	Gly
	290					295					300				
Arg	Leu	Ser	Tyr	Phe	Tyr	Gly	Leu	Glu	Gly	Pro	Ser	Val	Thr	Val	Asp
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Leu Ala Thr His Arg His Thr Gln Gly Gln Pro Ala Thr Thr Ile Ala
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Trp Gly Met Trp His Thr Thr Thr Leu Thr Ser Gln Leu Thr Asp
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Val Ala Ala Ala Leu Asp Asp Ala Pro Asp Val Pro Leu Leu Arg Gly
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ctg cgg cgt acg acc gtc cgg cgt gcc gcc gtc cgg gaa cgc tct ctg 143
Leu Arg Arg Thr Thr Val Arg Arg Ala Ala Val Arg Glu Arg Ser Leu
35 40 45

gcc gac cgc tcg ccg tgc tgc ccg acg acg agc gcg ccg acg cct ccc 191
Ala Asp Arg Ser Pro Cys Cys Pro Thr Thr Ser Ala Pro Thr Pro Pro
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tcg cgt tcg tcc tgg aac agc acc gcc acc gtg ctg ggc cac ctg ggc 239
Ser Arg Ser Ser Trp Asn Ser Thr Ala Thr Val Leu Gly His Leu Gly
65 70 75

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Ala Glu Asp Ile Pro Ala Thr Thr Phe Lys Glu Leu Gly Ile Asp
80 85 90 95

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Ser Leu Thr Ala Val Gln Leu Arg Asn Ala Leu Thr Thr Ala Thr Gly
100 105 110

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Val Arg Leu Asn Ala Thr Ala Val Phe Asp Phe Pro Thr Pro Arg Ala
115 120 125

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 Leu Ala Ala Arg Leu Gly Asp Glu Leu Ala Gly Thr Arg Ala Pro Val
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gcg gcc cgg acc gcg gcc acc gcg gcc cgc cac gac gaa ccg ctg gcg 479
 Ala Ala Arg Thr Ala Ala Thr Thr Ala Ala Ala His Asp Glu Pro Leu Ala
 145 150 155

atc gtg ggc atg gcc tgc cgt ctg ccg ggc ggg gtc gcg tcg cca cag 527
 Ile Val Gly Met Ala Cys Arg Leu Pro Gly Gly Val Ala Ser Pro Gln
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gag ctg tgg cgt ctc gtc gcg tcc ggc acc gac gcc atc acg gag ttc 575
 Glu Leu Trp Arg Leu Val Ala Ser Gly Thr Asp Ala Ile Thr Glu Phe
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ccc gcg gac cgc ggc tgg gac gtg gac gcg ctc tac gac ccg gac ccc 623
 Pro Ala Asp Arg Gly Trp Asp Val Asp Ala Leu Tyr Asp Pro Asp Pro
 195 200 205

gag gcg atc ggc aag acc ttc gtc cgg cac ggc ggc ttc ctc gac ggt 671
 Asp Ala Ile Gly Lys Thr Phe Val Arg His Gly Gly Phe Leu Asp Gly
 210 215 220

gcg acc ggc ttc gac gcg gcg ttc ttc ggg atc agc ccg cgc gag gcc 719
 Ala Thr Gly Phe Asp Ala Ala Phe Phe Gly Ile Ser Pro Arg Glu Ala
 225 230 235

ctg gcc atg gac ccg cag caa cgg gtg ctc ctg gag acg tcc tgg gag 767
 Leu Ala Met Asp Pro Gln Gln Arg Val Leu Leu Glu Thr Ser Trp Glu
 240 245 250 255

gcg ttc gaa agc gcg ggc atc acc ccg gac gcg gcg ccg ggc agc gac 815
 Ala Phe Glu Ser Ala Gly Ile Thr Pro Asp Ala Ala Arg Gly Ser Asp
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acc ggc gtg ttc atc ggc gcg ttc tcc tac ggg tac ggc acg ggt gcg 863
 Thr Gly Val Phe Ile Gly Ala Phe Ser Tyr Gly Tyr Gly Thr Gly Ala
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gat acc aac ggc ttc ggc gcg aca ggg tcg cag acc agc gtg ctc tcc 911
 Asp Thr Asn Gly Phe Gly Ala Thr Gly Ser Gln Thr Ser Val Leu Ser
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ggc cgc ctc tcg tac ttc tac ggt ctg gag ggc cct tcg gtc acg gtc 959
 Gly Arg Leu Ser Tyr Phe Tyr Gly Leu Glu Gly Pro Ser Val Thr Val
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gag acc gcc tgc tcg tcg tca ctg gtc gcc ctg cac cag gca ggg cag 1007
 Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Gln Ala Gly Gln
 320 325 330 335

tcc ctg cgc tcg ggc gaa tgc tcg ctc gcc ctg gtc ggc ggt gtc acg 1055
 Ser Leu Arg Ser Gly Glu Cys Ser Leu Ala Leu Val Gly Gly Val Thr
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Ala Thr Asp Cys Ala Thr Val Glu Gln Leu Asp Val Thr Ser Val Pro	
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Gly Gly Ser Ala Arg Gly Arg Ala Thr Ala Gln Thr Trp Val Asp Glu	
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ccc gcc gcc gac ggg cgg cgc cgc ttc acc gtc cac acc cgc gtc ggc	3263
Pro Ala Ala Asp Gly Arg Arg Phe Thr Val His Thr Arg Val Gly	
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Asp Ala Pro Trp Thr Leu His Ala Glu Gly Val Leu Arg Pro Gly Arg	
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Val Pro Gln Pro Glu Ala Val Asp Thr Ala Trp Pro Pro Gly Ala	
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Val Pro Ala Asp Gly Leu Pro Gly Ala Trp Arg Arg Ala Asp Gln Val	
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Phe Val Glu Ala Glu Val Asp Ser Pro Asp Gly Phe Val Ala His Pro	
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Pro Thr Gly Trp Arg Asp Leu Ala Val His Ala Ser Asp Ala Thr Val	
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Leu Arg Ala Cys Leu Thr Arg Arg Asp Ser Gly Val Val Glu Leu Ala	
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Ala Phe Asp Gly Ala Gly Met Pro Val Leu Thr Ala Glu Ser Val Thr	
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Leu Gly Glu Val Ala Ser Ala Gly Ser Asp Glu Ser Asp Gly Leu	
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Leu Arg Leu Glu Trp Leu Pro Val Ala Glu Ala His Tyr Asp Gly Ala	
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 Ala Arg Thr Ala Ala Thr Ala Ala Ala His Asp Glu Pro Leu Ala Ile
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 Val Gly Met Ala Cys Arg Leu Pro Gly Gly Val Ala Ser Pro Gln Glu
 165 170 175
 Leu Trp Arg Leu Val Ala Ser Gly Thr Asp Ala Ile Thr Glu Phe Pro
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 Ala Asp Arg Gly Trp Asp Val Asp Ala Leu Tyr Asp Pro Asp Pro Asp
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 Ala Ile Gly Lys Thr Phe Val Arg His Gly Gly Phe Leu Asp Gly Ala
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 Thr Gly Phe Asp Ala Ala Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu
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 Ala Met Asp Pro Gln Gln Arg Val Leu Leu Glu Thr Ser Trp Glu Ala
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 Phe Glu Ser Ala Gly Ile Thr Pro Asp Ala Ala Arg Gly Ser Asp Thr
 260 265 270
 Gly Val Phe Ile Gly Ala Phe Ser Tyr Gly Tyr Gly Thr Gly Ala Asp
 275 280 285
 Thr Asn Gly Phe Gly Ala Thr Gly Ser Gln Thr Ser Val Leu Ser Gly
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 Ser Phe Ala Glu Gly Ala Gly Ala Leu Val Val Glu Arg Leu Ser Asp
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 Ala Asn Ser Asp Gly Ala Ser Asn Gly Leu Ser Ala Pro Asn Gly Pro
 420 425 430
 Ser Gln Glu Arg Val Ile His Gln Ala Leu Ala Asn Ala Lys Leu Thr
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 Pro Ala Asp Val Asp Ala Val Glu Ala His Gly Thr Gly Thr Arg Leu
 450 455 460
 Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Gln Asp
 465 470 475 480
 Arg Ala Thr Pro Leu Leu Leu Gly Ser Leu Lys Ser Asn Ile Gly His
 485 490 495
 Ala Gln Ala Ala Ser Gly Val Ala Gly Ile Ile Lys Met Val Gln Ala
 500 505 510
 Ile Arg His Gly Glu Leu Pro Pro Thr Leu His Ala Asp Glu Pro Ser
 515 520 525
 Pro His Val Asp Trp Thr Ala Gly Ala Val Glu Leu Leu Thr Ser Ala
 530 535 540
 Arg Pro Trp Pro Gly Thr Gly Arg Pro Arg Arg Ala Ala Val Ser Ser
 545 550 555 560
 Phe Gly Val Ser Gly Thr Asn Ala His Ile Leu Glu Ala Gly Pro
 565 570 575
 Val Lys Thr Gly Pro Val Glu Ala Gly Ala Ile Glu Ala Gly Pro Val
 580 585 590
 Glu Val Gly Pro Val Glu Ala Gly Pro Leu Pro Ala Ala Pro Pro Ser
 595 600 605
 Ala Pro Gly Glu Asp Leu Pro Leu Leu Val Ser Ala Arg Ser Pro Glu
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 Ala Leu Asp Glu Gln Ile Gly Arg Leu Arg Ala Tyr Leu Asp Thr Gly
 625 630 635 640
 Pro Gly Val Asp Arg Ala Ala Val Ala Gln Thr Leu Ala Arg Arg Thr
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 His Phe Thr His Arg Ala Val Leu Leu Gly Asp Thr Val Ile Gly Ala
 660 665 670
 Pro Pro Ala Asp Gln Ala Asp Glu Leu Val Phe Val Tyr Ser Gly Gln
 675 680 685
 Gly Thr Gln His Pro Ala Met Gly Glu Gln Leu Ala Ala Phe Pro
 690 695 700

Val Thr Gly Leu Thr Arg Thr Ala Gln Asn Glu His Pro Gly Arg Ile
 1315 1320 1325
 His Leu Ile Glu Thr His His Pro His Thr Pro Leu Pro Leu Thr Gln
 1330 1335 1340
 Leu Thr Thr Leu His Gln Pro His Leu Arg Leu Thr Asn Asn Thr Leu
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 His Thr Pro His Leu Thr Pro Ile Thr Thr His His Asn Thr Thr Thr
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 Gln Ala Leu Thr His Ile Pro Gln Pro Leu Thr Gly Ile Phe His Thr
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 Pro Ala Thr Thr Ile Ala Trp Gly Met Trp His Thr Thr Thr Thr Leu
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Leu Leu Asp Ile Thr Ser Asp Ser Ser Ser Gln Thr Pro Leu Val Pro	
880 885 890 895	
tgg ctg tcg acc gtg gac ggc acc tgg gtc gac agc ccg ctg gac ggg	2735
Trp Leu Ser Thr Val Asp Gly Thr Trp Val Asp Ser Pro Leu Asp Gly	
900 905 910	
gag tac tgg tac cgg aac ctg cgt gaa ccg gtc ggt ttc cac ccc gcc	2783
Glu Tyr Trp Tyr Arg Asn Leu Arg Glu Pro Val Gly Phe His Pro Ala	
915 920 925	
gtc agc cag ttg cag gcc cag ggc gac acc gtg ttc gtc gag gtc agc	2831
Val Ser Gln Leu Gln Ala Gln Gly Asp Thr Val Phe Val Glu Val Ser	
930 935 940	
gcc agc ccg gtg ttg ttg cag gcg atg gac gac gat gtc gtc acg gtt	2879
Ala Ser Pro Val Leu Leu Gln Ala Met Asp Asp Asp Val Val Thr Val	
945 950 955	
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Ala Thr Leu Arg Arg Asp Asp Gly Asp Ala Thr Arg Met Leu Thr Ala	
960 965 970 975	
ctg gca cag gcc tat gtc cac ggc gtc acc gtc gac tgg ccc gcc atc	2975
Leu Ala Gln Ala Tyr Val His Gly Val Thr Val Asp Trp Pro Ala Ile	
980 985 990	
ctc ggc acc acc aca acc ccg gta ctg gac ctt ccg acc tac gcc ttc	3023
Leu Gly Thr Thr Thr Arg Val Leu Asp Leu Pro Thr Tyr Ala Phe	
995 1000 1005	
caa cac cag ccg tac tgg ctc gag tcg gct ccc ccg gcc acg gcc gac	3071
Gln His Gln Arg Tyr Trp Leu Glu Ser Ala Pro Pro Ala Thr Ala Asp	
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Ser Gly His Pro Val Leu Gly Thr Gly Val Ala Val Ala Gly Ser Pro	
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Phe Ile Ala Glu Leu Ala Leu Ala Ala Asp Ala Thr Asp Cys Ala	
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 1120 1125 1130 1135

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 1185 1190 1195

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 Asp Leu Ala Val His Ala Ser Asp Ala Thr Val Leu Arg Ala Cys Leu
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 Thr Arg Arg Asp Ser Gly Val Val Glu Leu Ala Ala Phe Asp Gly Ala
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 Gly Met Pro Val Leu Thr Ala Glu Ser Val Thr Leu Gly Glu Val Ala
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 Ser Ala Gly Gly Ser Asp Glu Ser Asp Gly Leu Leu Arg Leu Glu Trp
 1250 1255 1260

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 Leu Pro Val Ala Glu Ala His Tyr Asp Gly Ala Asp Glu Leu Pro Glu
 1265 1270 1275

ggc tac acc ctc atc acc gcc aca cac ccc gac gac ccc gac gac ccc 3887
 Gly Tyr Thr Leu Ile Thr Ala Thr His Pro Asp Pro Asp Asp Pro
 1280 1285 1290 1295

acc aac ccc cac aac aca ccc aca cgc acc cac aca caa acc aca cgc 3935
 Thr Asn Pro His Asn Thr Pro Thr Arg Thr His Thr Gln Thr Thr Arg
 1300 1305 1310

gtc ctc acc gcc ctc caa cac cac ctc atc acc acc aac cac acc ctc	3983
Val Leu Thr Ala Leu Gln His His Leu Ile Thr Thr Asn His Thr Leu	
1315 1320 1325	
atc gtc cac acc acc acc gac ccc cca ggc gcc gcc gtc acc ggc ctc	4031
Ile Val His Thr Thr Thr Asp Pro Pro Gly Ala Ala Val Thr Gly Leu	
1330 1335 1340	
acc cgc acc gca caa aac gaa cac ccc ggc cgc atc cac ctc atc gaa	4079
Thr Arg Thr Ala Gln Asn Glu His Pro Gly Arg Ile His Leu Ile Glu	
1345 1350 1355	
acc cac cac ccc cac acc cca ctc ccc ctc acc caa ctc acc acc ctc	4127
Thr His His Pro His Thr Pro Leu Pro Leu Thr Gln Leu Thr Thr Leu	
1360 1365 1370 1375	
cac caa ccc cac cta cgc ctc acc aac aac acc ctc cac acc ccc cac	4175
His Gln Pro His Leu Arg Leu Thr Asn Asn Thr Leu His Thr Pro His	
1380 1385 1390	
ctc acc ccc atc acc acc cac cac aac acc acc aca acc acc ccc aac	4223
Leu Thr Pro Ile Thr Thr His His Asn Thr Thr Thr Thr Pro Asn	
1395 1400 1405	
acc cca ccc ctc aac ccc aac cac gcc atc ctc atc acc ggc ggc tcc	4271
Thr Pro Pro Leu Asn Pro Asn His Ala Ile Leu Ile Thr Gly Gly Ser	
1410 1415 1420	
ggc acc ctc gcc ggc atc ctc gcc cgc cac ctc aac cac ccc cac acc	4319
Gly Thr Leu Ala Gly Ile Leu Ala Arg His Leu Asn His Pro His Thr	
1425 1430 1435	
tac ctc ctc tcc cgc aca cca cca ccc ccc acc aca ccc ggc acc cac	4367
Tyr Leu Leu Ser Arg Thr Pro Pro Pro Thr Thr Thr Pro Gly Thr His	
1440 1445 1450 1455	
atc ccc tgc gac ctc acc gac ccc acc caa atc acc caa gcc ctc acc	4415
Ile Pro Cys Asp Leu Thr Asp Pro Thr Gln Ile Thr Gln Ala Leu Thr	
1460 1465 1470	
cac ata cca caa ccc ctc acc ggc atc ttc cac acc gcc gcc acc ctc	4463
His Ile Pro Gln Pro Leu Thr Gly Ile Phe His Thr Ala Ala Thr Leu	
1475 1480 1485	
gac gac gcc acc ctc acc aac ctc acc ccc caa cac ctc acc acc acc	4511
Asp Asp Ala Thr Leu Thr Asn Leu Thr Pro Gln His Leu Thr Thr Thr	
1490 1495 1500	
ctc caa ccc aaa gcc gac gcc gcc tgg cac ctc cac cac acc acc caa	4559
Leu Gln Pro Lys Ala Asp Ala Ala Trp His Leu His His His Thr Gln	
1505 1510 1515	
aac caa ccc ctc acc cac ttc gtc ctc tac tcc agc gcc gcc gcc acc	4607
Asn Gln Pro Leu Thr His Phe Val Leu Tyr Ser Ser Ala Ala Ala Thr	
1520 1525 1530 1535	

ctc gcc agc ccc gcc caa gcc aac tac gcc gcc gcc aac gcc ttc ctc 4655
 Leu Gly Ser Pro Gly Gln Ala Asn Tyr Ala Ala Ala Asn Ala Phe Leu
 1540 1545 1550

gac gcc ctc gcc acc cac cgc cac acc caa gga caa ccc gcc acc acc 4703
 Asp Ala Leu Ala Thr His Arg His Thr Gln Gly Gln Pro Ala Thr Thr
 1555 1560 1565

atc gcc tgg gcc atg tgg cac acc acc acc aca ctc acc agc caa ctc 4751
 Ile Ala Trp Gly Met Trp His Thr Thr Thr Thr Leu Thr Ser Gln Leu
 1570 1575 1580

acc gac agc gac cgc gac cgc atc cgc cgc gcc gcc ttc ctg ccg atc 4799
 Thr Asp Ser Asp Arg Asp Arg Ile Arg Arg Gly Gly Phe Leu Pro Ile
 1585 1590 1595

tcg gac gac gag gcc atg c 4818
 Ser Asp Asp Glu Gly Met
 1600 1605

<210> 33

<211> 1605

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic PKS
 synthase fragment

<400> 33

Met Arg Leu Tyr Glu Ala Ala Arg Arg Thr Gly Ser Pro Val Val Val
 1 5 10 15

Ala Ala Ala Leu Asp Asp Ala Pro Asp Val Pro Leu Leu Arg Gly Leu
 20 25 30

Arg Arg Thr Thr Val Arg Arg Ala Ala Val Arg Glu Arg Ser Leu Ala
 35 40 45

Asp Arg Ser Pro Cys Cys Pro Thr Thr Ser Ala Pro Thr Pro Pro Ser
 50 55 60

Arg Ser Ser Trp Asn Ser Thr Ala Thr Val Leu Gly His Leu Gly Ala
 65 70 75 80

Glu Asp Ile Pro Ala Thr Thr Thr Phe Lys Glu Leu Gly Ile Asp Ser
 85 90 95

Leu Thr Ala Val Gln Leu Arg Asn Ala Leu Thr Thr Ala Thr Gly Val
 100 105 110

Arg Leu Asn Ala Thr Ala Val Phe Asp Phe Pro Thr Pro Arg Ala Leu
 115 120 125

Ala Ala Arg Leu Gly Asp Glu Leu Ala Gly Thr Arg Ala Pro Val Ala
 130 135 140

Ala Arg Thr Ala Ala Thr Ala Ala Ala His Asp Glu Pro Leu Ala Ile
 145 150 155 160
 Val Gly Met Ala Cys Arg Leu Pro Gly Gly Val Ala Ser Pro Gln Glu
 165 170 175
 Leu Trp Arg Leu Val Ala Ser Gly Thr Asp Ala Ile Thr Glu Phe Pro
 180 185 190
 Ala Asp Arg Gly Trp Asp Val Asp Ala Leu Tyr Asp Pro Asp Pro Asp
 195 200 205
 Ala Ile Gly Lys Thr Phe Val Arg His Gly Gly Phe Leu Asp Gly Ala
 210 215 220
 Thr Gly Phe Asp Ala Ala Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu
 225 230 235 240
 Ala Met Asp Pro Gln Gln Arg Val Leu Leu Glu Thr Ser Trp Glu Ala
 245 250 255
 Phe Glu Ser Ala Gly Ile Thr Pro Asp Ala Ala Arg Gly Ser Asp Thr
 260 265 270
 Gly Val Phe Ile Gly Ala Phe Ser Tyr Gly Tyr Gly Thr Gly Ala Asp
 275 280 285
 Thr Asn Gly Phe Gly Ala Thr Gly Ser Gln Thr Ser Val Leu Ser Gly
 290 295 300
 Arg Leu Ser Tyr Phe Tyr Gly Leu Glu Gly Pro Ser Val Thr Val Asp
 305 310 315 320
 Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Gln Ala Gly Gln Ser
 325 330 335
 Leu Arg Ser Gly Glu Cys Ser Leu Ala Leu Val Gly Gly Val Thr Val
 340 345 350
 Met Ala Ser Pro Gly Gly Phe Val Glu Phe Ser Arg Gln Arg Gly Leu
 355 360 365
 Ala Pro Asp Gly Arg Ala Lys Ala Phe Gly Ala Gly Ala Asp Gly Thr
 370 375 380
 Ser Phe Ala Glu Gly Ala Gly Ala Leu Val Val Glu Arg Leu Ser Asp
 385 390 395 400
 Ala Glu Arg His Gly His Thr Val Leu Ala Leu Val Arg Gly Ser Ala
 405 410 415
 Ala Asn Ser Asp Gly Ala Ser Asn Gly Leu Ser Ala Pro Asn Gly Pro
 420 425 430
 Ser Gln Glu Arg Val Ile His Gln Ala Leu Ala Asn Ala Lys Leu Thr
 435 440 445

Ala Ala Val Trp Gln Ala Ala Gly Val Arg Pro Asp Ala Val Ile Gly
 755 760 765
 His Ser Gln Gly Glu Ile Ala Ala Cys Val Ala Gly Ala Val Ser
 770 775 780
 Leu Arg Asp Ala Ala Arg Ile Val Thr Leu Arg Ser Gln Ala Ile Ala
 785 790 795 800
 Arg Gly Leu Ala Gly Arg Gly Ala Met Ala Ser Val Ala Leu Pro Ala
 805 810 815
 Gln Asp Val Glu Leu Val Asp Gly Ala Trp Ile Ala Ala His Asn Gly
 820 825 830
 Pro Ala Ser Thr Val Ile Ala Gly Thr Pro Glu Ala Val Asp His Val
 835 840 845
 Leu Thr Ala His Glu Ala Gln Gly Val Arg Val Arg Arg Ile Thr Val
 850 855 860
 Asp Tyr Ala Ser His Thr Pro His Val Glu Leu Ile Arg Asp Glu Leu
 865 870 875 880
 Leu Asp Ile Thr Ser Asp Ser Ser Ser Gln Thr Pro Leu Val Pro Trp
 885 890 895
 Leu Ser Thr Val Asp Gly Thr Trp Val Asp Ser Pro Leu Asp Gly Glu
 900 905 910
 Tyr Trp Tyr Arg Asn Leu Arg Glu Pro Val Gly Phe His Pro Ala Val
 915 920 925
 Ser Gln Leu Gln Ala Gln Gly Asp Thr Val Phe Val Glu Val Ser Ala
 930 935 940
 Ser Pro Val Leu Leu Gln Ala Met Asp Asp Asp Val Val Thr Val Ala
 945 950 955 960
 Thr Leu Arg Arg Asp Asp Gly Asp Ala Thr Arg Met Leu Thr Ala Leu
 965 970 975
 Ala Gln Ala Tyr Val His Gly Val Thr Val Asp Trp Pro Ala Ile Leu
 980 985 990
 Gly Thr Thr Thr Thr Arg Val Leu Asp Leu Pro Thr Tyr Ala Phe Gln
 995 1000 1005
 His Gln Arg Tyr Trp Leu Glu Ser Ala Pro Pro Ala Thr Ala Asp Ser
 1010 1015 1020
 Gly His Pro Val Leu Gly Thr Gly Val Ala Val Ala Gly Ser Pro Gly
 1025 1030 1035 1040
 Arg Val Phe Thr Gly Pro Val Pro Ala Gly Ala Asp Arg Ala Val Phe
 1045 1050 1055

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His His Pro His Thr Pro Leu Pro Leu Thr Gln Leu Thr Thr Leu His
 1365 1370 1375
 Gln Pro His Leu Arg Leu Thr Asn Asn Thr Leu His Thr Pro His Leu
 1380 1385 1390
 Thr Pro Ile Thr Thr His His Asn Thr Thr Thr Thr Pro Asn Thr
 1395 1400 1405
 Pro Pro Leu Asn Pro Asn His Ala Ile Leu Ile Thr Gly Gly Ser Gly
 1410 1415 1420
 Thr Leu Ala Gly Ile Leu Ala Arg His Leu Asn His Pro His Thr Tyr
 425 1430 1435 144
 Leu Leu Ser Arg Thr Pro Pro Pro Pro Thr Thr Pro Gly Thr His Ile
 1445 1450 1455
 Pro Cys Asp Leu Thr Asp Pro Thr Gln Ile Thr Gln Ala Leu Thr His
 1460 1465 1470
 Ile Pro Gln Pro Leu Thr Gly Ile Phe His Thr Ala Ala Thr Leu Asp
 1475 1480 1485
 Asp Ala Thr Leu Thr Asn Leu Thr Pro Gln His Leu Thr Thr Thr Leu
 1490 1495 1500
 Gln Pro Lys Ala Asp Ala Ala Trp His Leu His His His Thr Gln Asn
 505 1510 1515 152
 Gln Pro Leu Thr His Phe Val Leu Tyr Ser Ser Ala Ala Thr Leu
 1525 1530 1535
 Gly Ser Pro Gly Gln Ala Asn Tyr Ala Ala Ala Asn Ala Phe Leu Asp
 1540 1545 1550
 Ala Leu Ala Thr His Arg His Thr Gln Gly Gln Pro Ala Thr Thr Ile
 1555 1560 1565
 Ala Trp Gly Met Trp His Thr Thr Thr Thr Leu Thr Ser Gln Leu Thr
 1570 1575 1580
 Asp Ser Asp Arg Asp Arg Ile Arg Arg Gly Gly Phe Leu Pro Ile Ser
 585 1590 1595 160
 Asp Asp Glu Gly Met
 1605

<210> 34

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: DNA encoding synthetic
PKS synthase fragment

<220>
 <221> CDS
 <222> (1)..(33)

 <400> 34
 ggc cgt ccg cgc cgt gcg gcg gtc tcg tcg ttc 33
 Gly Arg Pro Arg Arg Ala Ala Val Ser Ser Phe
 1 5 10

 <210> 35
 <211> 11
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic PKS
 synthase fragment

 <400> 35
 Gly Arg Pro Arg Arg Ala Ala Val Ser Ser Phe
 1 5 10

 <210> 36
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: DNA encoding synthetic
 PKS synthase fragment

 <220>
 <221> CDS
 <222> (1)..(33)

 <400> 36
 acc cag cat ccc gcg atg ggt gag cgg ctc gcc 33
 Thr Gln His Pro Ala Met Gly Glu Arg Leu Ala
 1 5 10

 <210> 37
 <211> 11
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic PKS
 synthase fragment

 <400> 37
 Thr Gln His Pro Ala Met Gly Glu Arg Leu Ala
 1 5 10

<220>
 <221> CDS
 <222> (1)..(33)

<400> 48
 tcg cag cgt gct ggc atg ggt gag gaa ctg gcc 33
 Ser Gln Arg Ala Gly Met Gly Glu Glu Leu Ala
 1 5 10

<210> 49
 <211> 11
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic PKS
 synthase fragment

<400> 49
 Ser Gln Arg Ala Gly Met Gly Glu Glu Leu Ala
 1 5 10

<210> 50
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: DNA encoding synthetic
 PKS synthase fragment

<220>
 <221> CDS
 <222> (1)..(33)

<400> 50
 tac gcc ttc cag cac cag cgc tac tgg ctc gag 33
 Tyr Ala Phe Gln His Gln Arg Tyr Trp Leu Glu
 1 5 10

<210> 51
 <211> 11
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic PKS
 synthase fragment

<400> 51
 Tyr Ala Phe Gln His Gln Arg Tyr Trp Leu Glu
 1 5 10

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<210> 52
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: DNA encoding synthetic
 PKS synthase fragment

<220>
 <221> CDS
 <222> (1)..(33)

<400> 52
 gcg cga ccg cgc cgg gcg ggg gtc tcg tcg ttc 33
 Ala Arg Pro Arg Arg Ala Gly Val Ser Ser Phe
 1 5 10

<210> 53
 <211> 11
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic PKS
 synthase fragment

<400> 53
 Ala Arg Pro Arg Arg Ala Gly Val Ser Ser Phe
 1 5 10

<210> 54
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: DNA encoding synthetic
 PKS synthase fragment

<220>
 <221> CDS
 <222> (1)..(33)

<400> 54
 tgg cag tgg gcg ggc atg gcc gtc gac ctg ctc 33
 Trp Gln Trp Ala Gly Met Ala Val Asp Leu Leu
 1 5 10

<210> 55
 <211> 11
 <212> PRT
 <213> Artificial Sequence

0040346 002701

<220>
 <223> Description of Artificial Sequence: Synthetic PKS
 synthase fragment

 <400> 55
 Trp Gln Trp Ala Gly Met Ala Val Asp Leu Leu
 1 5 10

 <210> 56
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: DNA encoding synthetic
 PKS synthase fragment

 <220>
 <221> CDS
 <222> (1)..(33)

 <400> 56
 tac ccg ttc cag cgc gag cgc gtc tgg ctc gaa 33
 Tyr Pro Phe Gln Arg Glu Arg Val Trp Leu Glu
 1 5 10

 <210> 57
 <211> 11
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic PKS
 synthase fragment

 <400> 57
 Tyr Pro Phe Gln Arg Glu Arg Val Trp Leu Glu
 1 5 10

 <210> 58
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: DNA encoding synthetic
 PKS synthase fragment

 <220>
 <221> CDS
 <222> (1)..(33)

<400> 58
gac ggg gtg cgc cgg gca ggt gtg tgc gcg ttc 33
Asp Gly Val Arg Arg Ala Gly Val Ser Ala Phe
1 5 10

<210> 59
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic PKS
synthase fragment

<400> 59
Asp Gly Val Arg Arg Ala Gly Val Ser Ala Phe
1 5 10

<210> 60
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: DNA encoding synthetic
PKS synthase fragment

<220>
<221> CDS
<222> (1)..(33)

<400> 60
gcc cag tgg gaa ggc atg gcg cgg gag ttg ttg 33
Ala Gln Trp Glu Gly Met Ala Arg Glu Leu Leu
1 5 10

<210> 61
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic PKS
synthase fragment

<400> 61
Ala Gln Trp Glu Gly Met Ala Arg Glu Leu Leu
1 5 10

<210> 62
<211> 33
<212> DNA
<213> Artificial Sequence

0040316.082701

<220>
 <223> Description of Artificial Sequence: DNA encoding synthetic
 PKS synthase fragment

<220>
 <221> CDS
 <222> (1)..(33)

<400> 62
 tat cct ttc cag gcc aag cgg ttc tgg ctg ctg 33
 Tyr Pro Phe Gln Gly Lys Arg Phe Trp Leu Leu
 1 5 10

<210> 63
 <211> 11
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic PKS
 synthase fragment

<400> 63
 Tyr Pro Phe Gln Gly Lys Arg Phe Trp Leu Leu
 1 5 10

<210> 64
 <211> 480
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: DNA encoding synthetic
 PKS synthase fragment

<220>
 <221> CDS
 <222> (3)..(479)

<400> 64
 cc gcc gcc gtc gaa ctg ctg acg tcg gcc cgg ccg tgg ccc gag acc 47
 Gly Ala Val Glu Leu Leu Thr Ser Ala Arg Pro Trp Pro Glu Thr
 1 5 10 15

gac cgg cca cgg cgt gcc gcc gtc tcc tcg ttc ggg gtg agc gcc acc 95
 Asp Arg Pro Arg Ala Ala Val Ser Ser Phe Gly Val Ser Gly Thr
 20 25 30

aac gcc cac gtc atc ctg gag gcc gga cgg gta acg gag acg ccc gcg 143
 Asn Ala His Val Ile Leu Glu Ala Gly Pro Val Thr Glu Thr Pro Ala
 35 40 45

gca tcg cct tcc ggt gac ctt ccc ctg ctg gtg tcg gca cgc tca cgg 191
 Ala Ser Pro Ser Gly Asp Leu Pro Leu Leu Val Ser Ala Arg Ser Pro
 50 55 60

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gaa gcg ctc gac gag cag atc cgc cga ctg cgc gcc tac ctg gac acc 239
 Glu Ala Leu Asp Glu Gln Ile Arg Arg Leu Arg Ala Tyr Leu Asp Thr
 65 70 75

acc ccg gac gtc gac cgg gtg gcc gtg gca cag acg ctg gcc cgg cgc 287
 Thr Pro Asp Val Asp Arg Val Ala Val Ala Gln Thr Leu Ala Arg Arg
 80 85 90 95

aca cac ttc gcc cac cgc gcc gtg ctg ctc ggt gac acc gtc atc acc 335
 Thr His Phe Ala His Arg Ala Val Leu Leu Gly Asp Thr Val Ile Thr
 100 105 110

aca ccc ccc gcg gac cgg ccc gac gaa ctc gtc ttc gtc tac tcc gcc 383
 Thr Pro Pro Ala Asp Arg Pro Asp Glu Leu Val Phe Val Tyr Ser Gly
 115 120 125

cag ggc acc cag cat ccc gcg atg ggc gag cag ctc gcc gcc gcc cat 431
 Gln Gly Thr Gln His Pro Ala Met Gly Glu Gln Leu Ala Ala Ala His
 130 135 140

ccc gtg ttc gcc gac gcc tgg cat gaa gcg ctc cgc cgc ctt gac aac c 480
 Pro Val Phe Ala Asp Ala Trp His Glu Ala Leu Arg Arg Leu Asp Asn
 145 150 155

<210> 65

<211> 159

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic PKS
 synthase fragment

<400> 65

Gly Ala Val Glu Leu Leu Thr Ser Ala Arg Pro Trp Pro Glu Thr Asp
 1 5 10 15

Arg Pro Arg Arg Ala Ala Val Ser Ser Phe Gly Val Ser Gly Thr Asn
 20 25 30

Ala His Val Ile Leu Glu Ala Gly Pro Val Thr Glu Thr Pro Ala Ala
 35 40 45

Ser Pro Ser Gly Asp Leu Pro Leu Leu Val Ser Ala Arg Ser Pro Glu
 50 55 60

Ala Leu Asp Glu Gln Ile Arg Arg Leu Arg Ala Tyr Leu Asp Thr Thr
 65 70 75 80

Pro Asp Val Asp Arg Val Ala Val Ala Gln Thr Leu Ala Arg Arg Thr
 85 90 95

His Phe Ala His Arg Ala Val Leu Leu Gly Asp Thr Val Ile Thr Thr
 100 105 110

Pro Pro Ala Asp Arg Pro Asp Glu Leu Val Phe Val Tyr Ser Gly Gln
115 120 125

Gly Thr Gln His Pro Ala Met Gly Glu Gln Leu Ala Ala Ala His Pro
130 135 140

Val Phe Ala Asp Ala Trp His Glu Ala Leu Arg Arg Leu Asp Asn
145 150 155

<210> 66

<211> 120

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: DNA encoding synthetic
PKS synthase fragment

<220>

<221> CDS

<222> (3)..(119)

<400> 66

tc ctc ggg gct ggg tca cgg cac gac gcg gat gtg ccc gcg tac gcg 47
Leu Gly Ala Gly Ser Arg His Asp Ala Asp Val Pro Ala Tyr Ala
1 5 10 15

ttc caa cgg cgg cac tac tgg atc gag tcg gca cgc ccg gcc gca tcc 95
Phe Gln Arg Arg His Tyr Trp Ile Glu Ser Ala Arg Pro Ala Ala Ser
20 25 30

gac gcg ggc cac ccc gtg ctg ggc t 120
Asp Ala Gly His Pro Val Leu Gly
35

<210> 67

<211> 39

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic PKS
synthase fragment

<400> 67

Leu Gly Ala Gly Ser Arg His Asp Ala Asp Val Pro Ala Tyr Ala Phe
1 5 10 15

Gln Arg Arg His Tyr Trp Ile Glu Ser Ala Arg Pro Ala Ala Ser Asp
20 25 30

Ala Gly His Pro Val Leu Gly
35

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<210> 68
 <211> 480
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: DNA encoding synthetic
 PKS synthase fragment

<220>
 <221> CDS
 <222> (1)..(480)

<400> 68
 tcg gcc agg ccg tgg ccg ccg acc gcc cgt ccg cgc cgt gcg gcg gtc 48
 Ser Ala Arg Pro Trp Pro Arg Thr Gly Arg Pro Arg Arg Ala Ala Val
 1 5 10 15

tcg tcg ttc ggg gtg agc gcc acc aac gcc cac atc atc ctg gag gcc 96
 Ser Ser Phe Gly Val Ser Gly Thr Asn Ala His Ile Ile Leu Glu Ala
 20 25 30

gga ccc gac cag gag gag ccg tcg gca gaa ccg gcc ggt gac ctc ccg 144
 Gly Pro Asp Gln Glu Glu Pro Ser Ala Glu Pro Ala Gly Asp Leu Pro
 35 40 45

ctg ctc gtg tcg gca ccg tcc ccg gag gca ctg gac gag cag atc ggg 192
 Leu Leu Val Ser Ala Arg Ser Pro Glu Ala Leu Asp Glu Gln Ile Gly
 50 55 60

cgc ctg cgc gac tat ctc gac gcc gcc ccc gcc gtg gac ctg gcg gcc 240
 Arg Leu Arg Asp Tyr Leu Asp Ala Ala Pro Gly Val Asp Leu Ala Ala
 65 70 75 80

gtg gcg ccg aca ctg gcc acg cgt acg cac ttc tcc cac cgc gcc gta 288
 Val Ala Arg Thr Leu Ala Thr Arg Thr His Phe Ser His Arg Ala Val
 85 90 95

ctg ctc ggt gac acc gtc atc acc gct ccc ccc gtg gaa cag ccg gcc 336
 Leu Leu Gly Asp Thr Val Ile Thr Ala Pro Pro Val Glu Gln Pro Gly
 100 105 110

gag ctc gtc ttc gtc tac tcg gga cag gcc acc cag cat ccc gcg atg 384
 Glu Leu Val Phe Val Tyr Ser Gly Gln Gly Thr Gln His Pro Ala Met
 115 120 125

ggt gag ccg ctc gcc gca gcc ttc ccc gtg ttc gcc gac ccg gac gta 432
 Gly Glu Arg Leu Ala Ala Phe Pro Val Phe Ala Asp Pro Asp Val
 130 135 140

ccc gcc tac gcc ttc cag ccg ccg ccc tac tgg atc gag tcc gcg ccg 480
 Pro Ala Tyr Ala Phe Gln Arg Arg Pro Tyr Trp Ile Glu Ser Ala Pro
 145 150 155 160

<210> 69
 <211> 160
 <212> PRT

0940315.082701

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic PKS synthase fragment

<400> 69

Ser Ala Arg Pro Trp Pro Arg Thr Gly Arg Pro Arg Arg Ala Ala Val
1 5 10 15

Ser Ser Phe Gly Val Ser Gly Thr Asn Ala His Ile Ile Leu Glu Ala
20 25 30

Gly Pro Asp Gln Glu Glu Pro Ser Ala Glu Pro Ala Gly Asp Leu Pro
35 40 45

Leu Leu Val Ser Ala Arg Ser Pro Glu Ala Leu Asp Glu Gln Ile Gly
50 55 60

Arg Leu Arg Asp Tyr Leu Asp Ala Ala Pro Gly Val Asp Leu Ala Ala
65 70 75 80

Val Ala Arg Thr Leu Ala Thr Arg Thr His Phe Ser His Arg Ala Val
85 90 95

Leu Leu Gly Asp Thr Val Ile Thr Ala Pro Pro Val Glu Gln Pro Gly
100 105 110

Glu Leu Val Phe Val Tyr Ser Gly Gln Gly Thr Gln His Pro Ala Met
115 120 125

Gly Glu Arg Leu Ala Ala Phe Pro Val Phe Ala Asp Pro Asp Val
130 135 140

Pro Ala Tyr Ala Phe Gln Arg Arg Pro Tyr Trp Ile Glu Ser Ala Pro
145 150 155 160

<210> 70

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: DNA encoding synthetic PKS synthase fragment

<220>

<221> CDS

<222> (1)..(60)

<400> 70

gac ccg gac gta ccc gcc tac gcc ttc cag cgg cgg ccc tac tgg atc 48
Asp Pro Asp Val Pro Ala Tyr Ala Phe Gln Arg Arg Pro Tyr Trp Ile
1 5 10 15

gag tcc gcg ccg
 Glu Ser Ala Pro
 20

60

<210> 71
 <211> 20
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic PKS
 synthase fragment

<400> 71
 Asp Pro Asp Val Pro Ala Tyr Ala Phe Gln Arg Arg Pro Tyr Trp Ile
 1 5 10 15

Glu Ser Ala Pro
 20

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